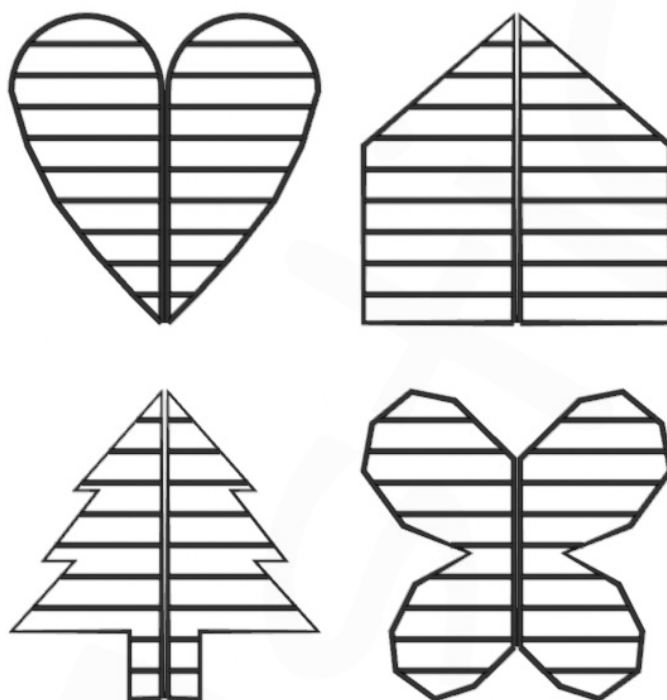


MAKE • DISCOVER • COLLECT

Find the other half

Ages 8 and up; use of the pen and adult assistance must follow the device instructions. •
Approximately 45–75 minutes, including 30–50 minutes of pen work.



Make eight separate PLA halves: first the outline, then the infill. Mix up the parts and find the pairs that form a heart, a house, a Christmas tree, and a butterfly. Choose the PLA colors yourself; match the pieces by their overall shape.



Your outcome

Make the puzzle and choose the other half based on the complete silhouette.

Construction illustration. The instructions show the successive stages. Full-size (1:1) templates are supplied on a separate sheet.

What you need

A 3D pen, the selected filament and equipment available in your workspace. See the complete list below.

Equipment

- | | |
|---|--------------|
| ☐ PLA 3D pen with required equipment | 1 set |
|---|--------------|

Material

- | | |
|---|---|
| ☐ PLA in colors of your choice | See the filament amounts below; allow some extra |
|---|---|

Equipment

- | | |
|---|----------------|
| ☐ Transparent mat from the kit | 1 piece |
|---|----------------|

Printouts

- | | |
|---|----------------------------------|
| ☐ Template printouts at 100% scale | 1 set: 8 different halves |
|---|----------------------------------|

Equipment

- | | |
|---|----------------|
| ☐ Ruler with millimeter markings | 1 piece |
|---|----------------|

Filament — amounts include extra

- | | |
|--|-------------------------|
| ☐ PLA 1.75 mm — any PLA color you choose (the illustration color is an example) | 4.5 m · ≈ 13.5 g |
|--|-------------------------|

Total filament: 4.5 m · approximately 13.5 g

The quantities include extra filament. Grams indicate estimated net filament mass, excluding packaging.

Before you start

- 1 With an adult, check the pen instructions, the approved age range, and the settings for PLA. Choose the PLA colors.
- 2 “Left” and “right” refer to the sides of the finished picture viewed from above. The straight edge of each half is its matching edge.
- 3 Print the templates at 100% scale, without fitting them to the page. Use a ruler to check that the reference line is 20 mm long.
- 4 Place the 1:1 template under the transparent mat from the kit on a stable worktop. Prepare a place for cooled parts and for setting down the pen.
- 5 Make the halves one at a time, following the template layout on the sheet. Finish each one and let it cool completely before clearing the space for the next one.

This is an editorial estimate for the approved design, not a measurement or a limit. The pace, cooling time, and corrections depend on the device and the participant. You may take a break after a half has cooled completely and the pen has been turned off according to its instructions.



How to read the instructions

The large image shows the completed stage. Small views show the action and current parts. ×N means repeat the whole action N times, cooling and checking each time. Illustrations are not at 1:1 scale.

STAGE 01 / 05 • Session 1

Prepare the workstation

Preparation

With an adult, check the pen instructions, the approved age range, and the settings for PLA. Choose the PLA colors. Print the templates at 100% scale, without fitting them to the page. Use a ruler to check that the reference line is 20 mm long. Place the 1:1 template under the transparent mat from the kit on a stable worktop.

Prepare a place for cooled parts and for setting down the pen. Make the halves one at a time, following the template layout on the sheet. Finish each one and let it cool completely before clearing the space for the next one.



Check

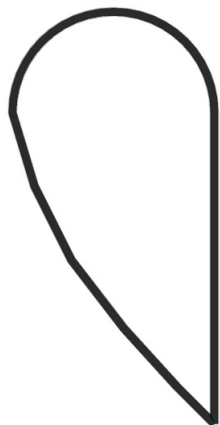
The reference line is 20 mm long, the template is under the transparent mat, and the PLA and work area have been prepared according to the pen instructions.

If it does not work

If the line is not 20 mm long, print the templates again at 100% scale without fitting them to the page. Check the PLA settings with an adult.

STAGE 02 / 05 • Session 1

Draw the first outline



Closed outline

NOW Heart — left half

Blue / dark emphasis: the part used in this action. Arrows: visual guides. Illustration not to scale.

PARTS FOR THIS STAGE

1 × Heart — left half · PLA | template W01–W08

→ T001 • Techniques — reference appendix

On the template for this half, start at the straight edge. Guide the PLA around the entire contour and return to the starting point. Join the end to the beginning to close the outline. Make only this half; do not fuse it to another one.



Check

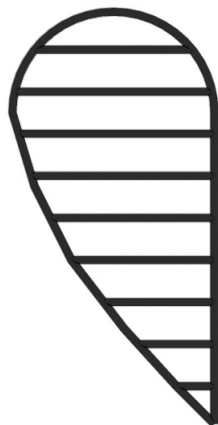
The outline is closed, and the straight edge has not been widened.

If it does not work

Close the gap with a short strand that overlaps both ends, working on the flat surface.

STAGE 03 / 05 • Session 1

Fill in the first half



Outline with 9 strands

NOW Heart — left half

Blue / dark emphasis: the part used in this action. Arrows: visual guides. Illustration not to scale.

Add 9 crosswise strands as shown on the template, working from top to bottom. Guide each one along the surface from one side of the outline to the other. Use the pen tip to join both ends to the outline with fresh PLA. Do not touch the hot material. Wait until the piece has cooled completely. Only then clear the space for the next half.



Check

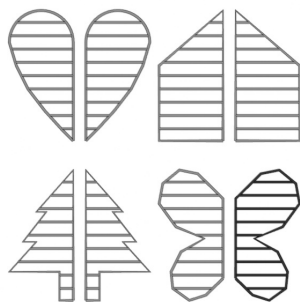
There are 9 visible strands joined at both ends. The half is separate and flat.

If it does not work

Join a loose end to the outline with a short strand on the surface. Wait until the piece has cooled completely. Remake a misshapen half; do not try to straighten cold PLA by force.

STAGE 04 / 05 • Session 1

Make the remaining 7 halves



The current stage ends with a complete set of 8 separate halves



Current stage: outline of the second half • What to repeat: House—left: outline; House—right: outline; Christmas tree—left: outline; Christmas tree—right: outline; Butterfly—left: outline; Butterfly—right: outline



Technique example from the first half — repeat it for every remaining half • What to repeat: Heart—right: 9 strands; House—left: 9 strands; House—right: 9 strands; Christmas tree—left: 9 strands; Christmas tree—right: 9 strands; Butterfly—left: 9 strands; Butterfly—right: 9 strands

NOW Heart — right half · House — left half · House — right half · Christmas tree — left half · Christmas tree — right half · Butterfly — left half · Butterfly — right half

Blue / dark emphasis: the part used in this action. Arrows: visual guides. Illustration not to scale.

PARTS FOR THIS STAGE

1 × Heart — right half; 1 × House — left half; 1 × House — right half; 1 × Christmas tree — left half; 1 × Christmas tree — right half; 1 × Butterfly — left half; 1 × Butterfly — right half · PLA | template W01–W08

→ T001 • Techniques — reference appendix

Repeat the same technique for W02–W08: close each outline, add the 9 strands shown on the template, and join their ends to the outline. Work on one half at a time, let it cool completely, and only then clear the space for the next one. Do not fuse the halves together. Choose the PLA colors yourself.

The illustration shows the complete set after the repeats; the accent marks the final half, W08.



Check

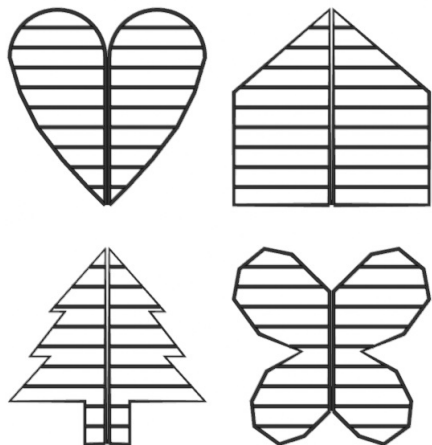
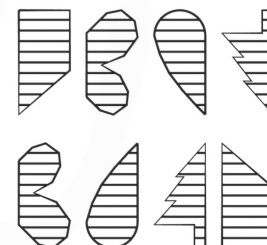
Count 8 separate, flat halves: 2 for each picture. All outlines are closed, and the strands are attached at both ends.

If it does not work

Make the missing half using its template. Join a loose strand to the outline on the surface; let it cool before checking it.

STAGE 05 / 05 • Session 1

Mix them up and find the other half



8 mixed-up halves

4 matched silhouettes

NOW Heart — left half · Heart — right half · House — left half · House — right half · Christmas tree — left half · Christmas tree — right half · Butterfly — left half · Butterfly — right half

Blue / dark emphasis: the part used in this action. Arrows: visual guides. Illustration not to scale.

Once the pieces have cooled completely, turn off the pen and set it down according to the instructions. Mix up the 8 halves; move them one at a time over an open space. Choose one, find its match by comparing the outline, and place the straight edges together. Make 4 pictures. Identify the overall shape regardless of the colors.

Keep the halves separate; do not fuse or press them together. After playing, put away all 8 cooled parts.



Check

Viewed from above, you can identify a heart, a house, a Christmas tree, and a butterfly. Each picture consists of 2 loose halves and measures approximately 8 × 8 cm.

If it does not work

If the shape does not match, rotate the part or choose another one. Set a damaged part aside for repair on the surface with an adult's help; let it cool completely before playing.

Finished — check the outcome



Check

There are exactly 8 separate PLA halves in any colors you choose; match the pairs by shape.



Check

Each half is flat and cool, with a closed outline and strands joined at both ends.



Check

The four pairs form a recognizable heart, house, Christmas tree, and butterfly, each approximately 8 × 8 cm.



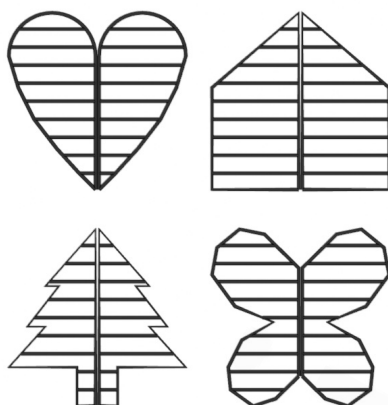
Check

All pairs can be separated and matched again by silhouette, without bending or gluing.

Storage

Store the model in a cool place away from sunlight and heat. Repair it on a suitable 3D-pen work surface using the same material as the part.

Four pictures from eight halves



Techniques — reference appendix

T001 • Stage 2 • Stage 4

1 × Heart — left half · PLA | template W01–W08

1 × Heart — right half; 1 × House — left half; 1 × House — right half; 1 × Christmas tree — left half; 1 × Christmas tree — right half; 1 × Butterfly — left half; 1 × Butterfly — right half · PLA | template W01–W08

On the 1:1 template for this half, make one closed outline with a straight matching edge. Add 9 crosswise strands along the surface, from one side of the outline to the other; join both ends of each strand to the outline with fresh PLA. Make one layer, with strands about 1.6 mm wide.

Do not fuse the halves together or build up the straight edge outwards. Wait until the piece has cooled completely.