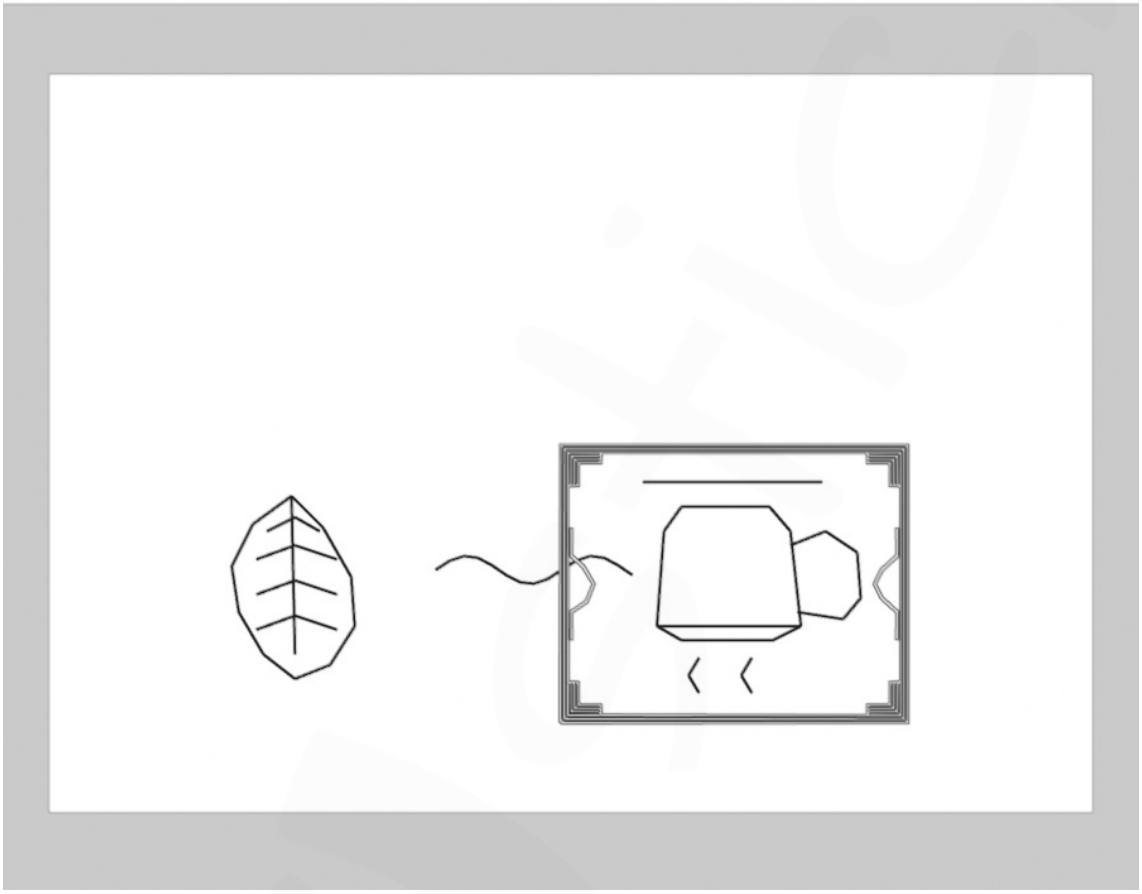
MAKE • DISCOVER • COLLECT

# A frame that selects the view

8+ • with adult assistance and in accordance with the device instructions • About 25–45 min total; 15–25 min working with the pen



Create a flat frame and choose which part of your own drawing you want to show. Moving the frame changes the view.

**Your outcome**

Make your own frame and decide which part of the drawing to show.

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

# What you need

Additional items are needed. Prepare the complete list below before starting.

## Equipment and supplies

| | | |
|---|---|---|
| ☐ | 3D pen for 1,75 mm PLA<br>Follow the device instructions; power supply and a place to rest the tip. | **1 pc.** |
| ☐ | Flexible transparent PLA mat with a real mm scale<br>At least 120 × 120 mm; approved for the device operating temperature. | **1 pc.** |
| ☐ | A4 paper<br>One for printout W01, the other for the drawing; your own ready-made drawing replaces the second sheet. | **2 sheets** |
| ☐ | Pencil<br>For a clear sketch; not needed if the drawing is ready. | **1 pc.** |
| ☐ | Scissors<br>Only for loose, cooled strands; an adult helps the child. | **1 pair** |
| ☐ | Access to an A4 printer<br>W01 at 100%, without fit-to-page. | **1 printout** |
| ☐ | Stable work surface<br>Space for the mat and an A4 sheet; a surface resistant to the working conditions specified in the equipment instructions. | **1 workstation** |

## Filament — amounts include extra

| | | |
|---|---|---|
| ☐ | PLA 1.75 mm — Turquoise or another color that contrasts with the sketch | **1.0 m · ≈ 3.0 g** |

**Total filament: 1.0 m · approximately 3.0 g**

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

# Before you start

**Age and hot tip**

8+ refers to the age needed to understand the task. The device instructions specify the minimum age and supervision. If they require an older operator, an adult operates the pen while the child designs the view. Do not touch the nozzle or hot PLA.

**How to read the illustrations**

The illustrations show the frame as it is built and the selection of views. Work on the transparent mat over printout W01. The illustrations are not 1:1 templates; the mat remains a piece of equipment.

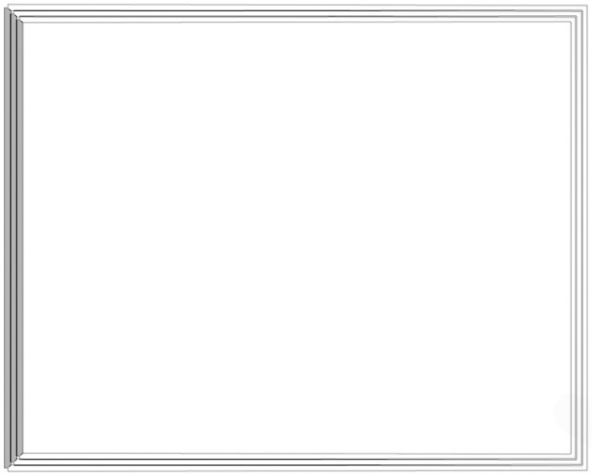
1. Place the mat securely, flat and fully on the work surface, away from the table edge. Prepare a place to rest the pen according to its instructions.
2. Print W01 at 100%, without fit-to-page. Compare the 20 mm control segment with the actual mat scale: it should span 20 mm, or four 5 mm grid squares. If the scale is wrong, correct the printout before starting.
3. Place W01 under the transparent mat. Do not cut out the template. Prepare your own drawing larger than the frame, with two motifs far apart. The leaf and mug in the illustration are examples only.
4. Set up the PLA and feed according to the device instructions. W01 shows a 3,2 mm band and a solid black 20 × 1,2 mm thickness control strip in the footer. The dimensions are nominal path targets, not nozzle diameter settings.

**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 / 06 • Session 1

# Close the outline



Closed outline



First side: three adjacent paths

Three connected sides

NOW Flat 100 × 80 mm frame

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

**PARTS FOR THIS STAGE**

1 × Flat 100 × 80 mm frame · PLA | template follow the written method

On W01, lay three adjacent paths in one layer. Nominal path diameter after leaving the nozzle: 1,2 mm; finished band width: 3,2 mm; item thickness: approximately 1,2 mm. The path centers are spaced 1 mm apart, so the edges join. Widen the corners to 6,2 mm.

The input filament diameter is 1,75 mm; this is the material size for a compatible pen, not the path size. Compare the width with the W01 outline, and the cooled edge with the solid black 20 × 1,2 mm strip in the W01 footer, viewing the edge from the side. Finished cross-section [mm]: 3.2 × 1.2. Number of layers: 1. Number of passes: 3.

Support: The entire new path lies on the flexible mat. Strand direction: Three paths side by side; corners inward, without stacking. Cooling: Cool the entire piece on the mat before peeling it off. Tip access: Guide the tip from above; do not press the nozzle against the mat.

On the transparent mat over W01, make the first side, then three connected sides and close the outline. Lay three touching Ø 1,2 mm paths side by side in one layer. Join the end to the start across the full width of the band. Add the decorations and widening later.

✓ **Check**

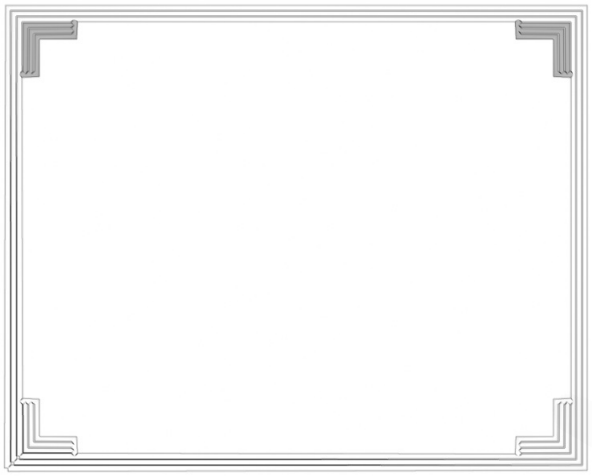
Compare with W01: a closed outline without gaps, width 3,2 mm, thickness approximately 1,2 mm.

**If it does not work**

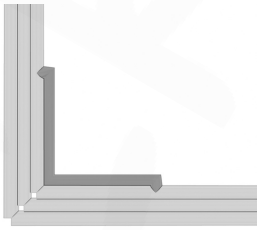
Fill the missing connection on the mat according to W01. Do not stack layers. Redo an uneven or broken outline.

STAGE 02 / 06 • Session 1

# Widen the four corners



Four corners complete



First widening path

Entire outline: two corners complete

NOW Flat 100 × 80 mm frame

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

At each corner, add three touching L-shaped paths on the inside, still in one layer. Start with one corner, complete two, then all four. Connect the ends of each path to the existing band. The widening is 6,2 mm along both arms of the corner.

**Check**

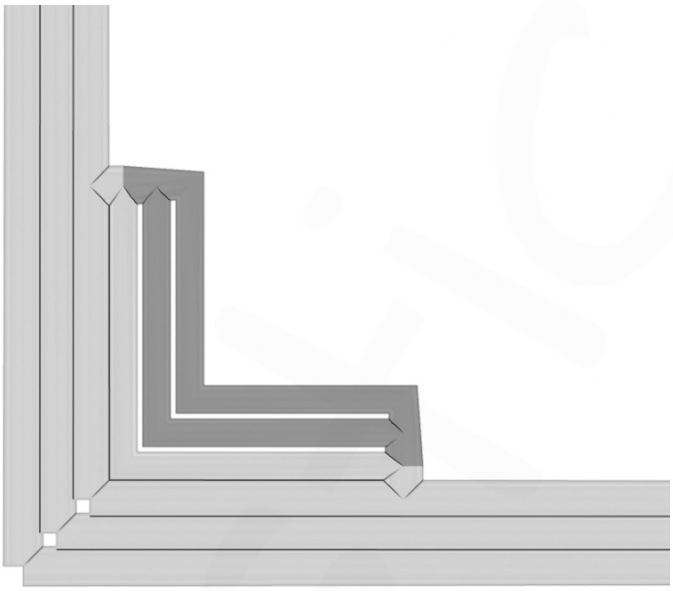
Compare the four corners with W01. They are wider than the sides, connected and flat; the outer dimensions remain 100 × 80 mm.

**If it does not work**

Fill any gap on the mat by connecting adjacent paths. If a corner breaks, make an entirely new frame instead of repairing it by bending.

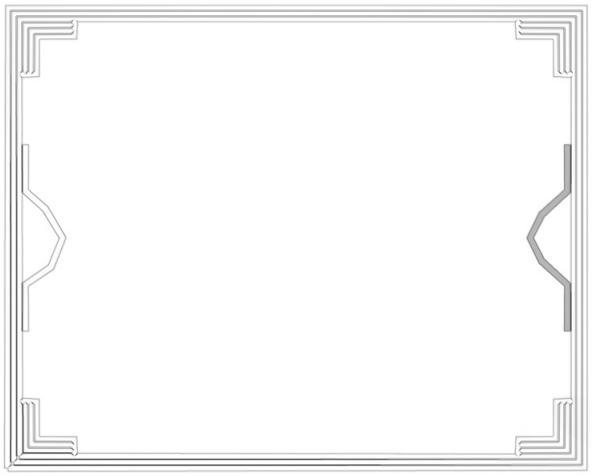
# Widen the four corners — construction details

## Three paths; two corners complete

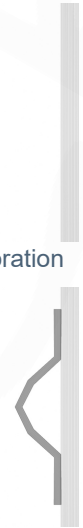


STAGE 03 / 06 • Session 1

# Add two decorative lines



Stage outcome



One decoration



Two decorations; both connected at the ends

NOW Flat 100 × 80 mm frame

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

Add two decorative lines on the mat along the inner sides of the outline, first the left and then the right. Join the start and end of each to the band over several millimeters. Switch off and put away the pen according to its instructions. Leave the frame flat on the mat until fully cool.

Remove it only when cold, supporting the sides and corners; do not bend the PLA or pull on the decorations.

✓ **Check**

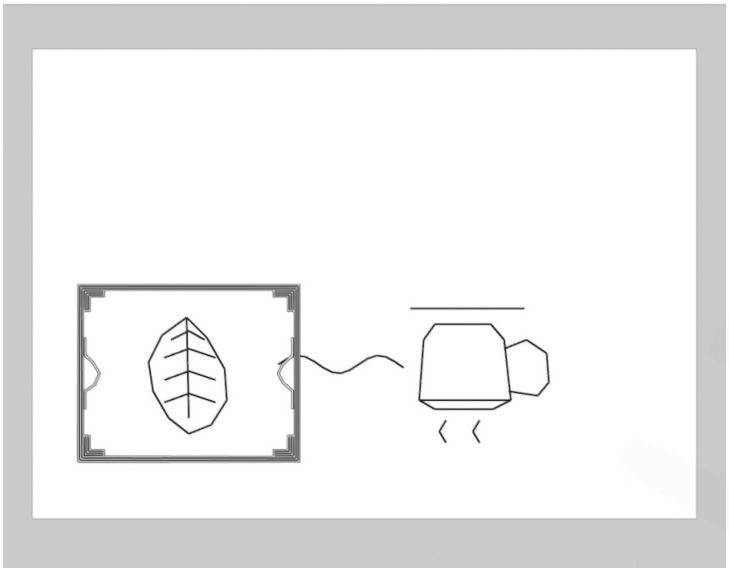
The two lines connect to the outline at both ends; the window is open. After cooling, compare the edge from the side with the black 20 × 1,2 mm strip on W01: you are checking the thickness, not the band width.

**If it does not work**

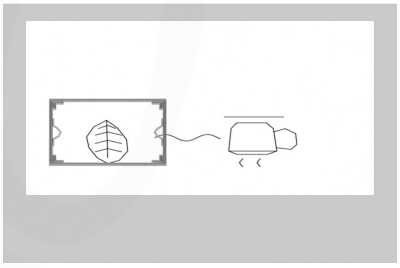
Complete the missing contact on the mat and cool it again. If the frame does not release freely, stop and gently separate the mat while supporting the cold frame flat. If it breaks, remake it from the start.

STAGE 04 / 06 • Session 1

# Place the cold frame on the first view



View 1: frame on the paper



Cold frame over the first motif

NOW Flat 100 × 80 mm frame

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

Hold the fully cooled frame by the sides and corners. Supporting it flat, position it approximately 10 mm above the first motif on the sheet, then lower it onto the paper. View the first frame.

✓ **Check**

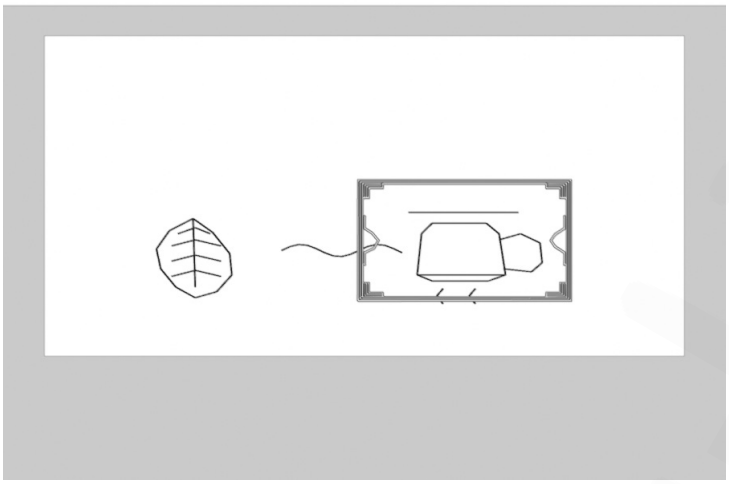
The frame lies flat, and the first motif is visible through the open window. The paper and drawing remain in place.

**If it does not work**

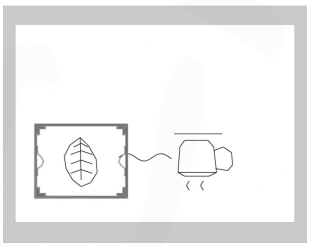
If the frame catches on the paper, lift the entire frame and lower it again without bending it. Do not hold it by the decorations.

STAGE 05 / 06 • Session 1

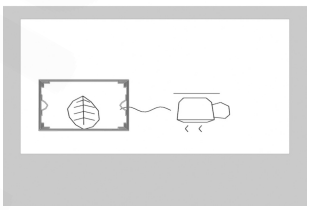
# View the first frame, then lift and move the frame



Over view 2: moved by 125 mm



View 1: leaf



Entire frame 10 mm above the paper

NOW Flat 100 × 80 mm frame

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

View the first frame. Hold the sheet in place. Supporting the sides and corners of the cold frame, lift the entire frame flat approximately 10 mm above the paper and move it 125 mm to the right over the second motif. Do not hold it by the decorations.

✓ **Check**

The sheet remains stationary. During the transfer, the entire frame is above the drawing, flat and supported in both hands; the second view shows a different motif.

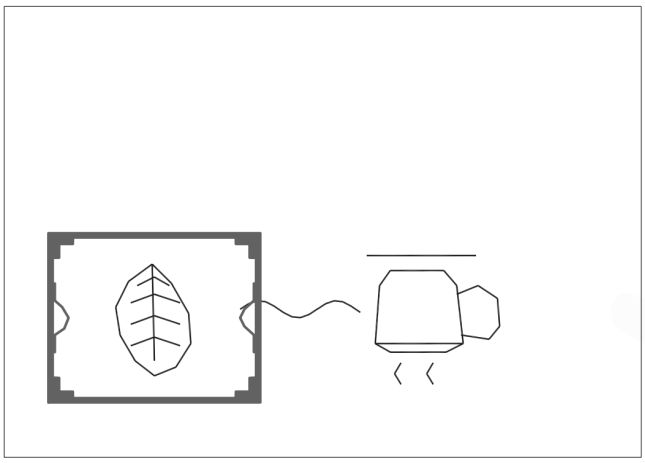
**If it does not work**

If the frame catches on the paper, stop and lift the entire frame higher without bending the PLA. A broken frame must be remade from the start.

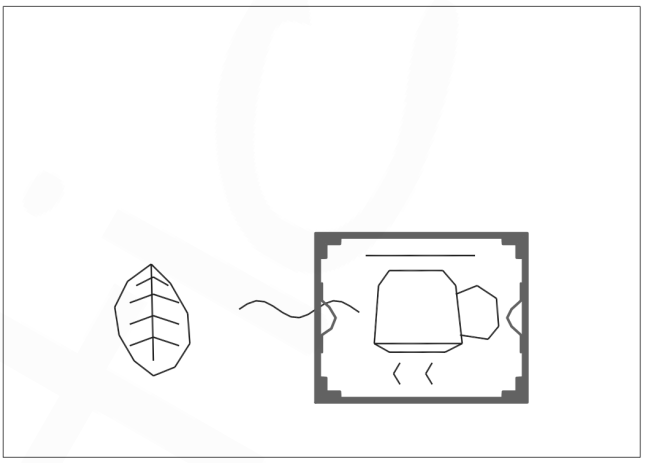
STAGE 06 / 06 • Session 1

# Lower the frame and compare the views

1



2



Dwa kolejne położenia tej samej ramki na tej samej kartce: 1 — liść, 2 — kubek. Schemat z dokładnej geometrii O05a i O05b, widok z góry; ilustracja bez skali. Na własnym rysunku wybierz dwa różne kadry.

Supporting the sides and corners, lower the frame flat from approximately 10 mm onto the same stationary sheet. Compare the leaf view with the mug view. On your own drawing, choose two different sections.

✓ **Check**

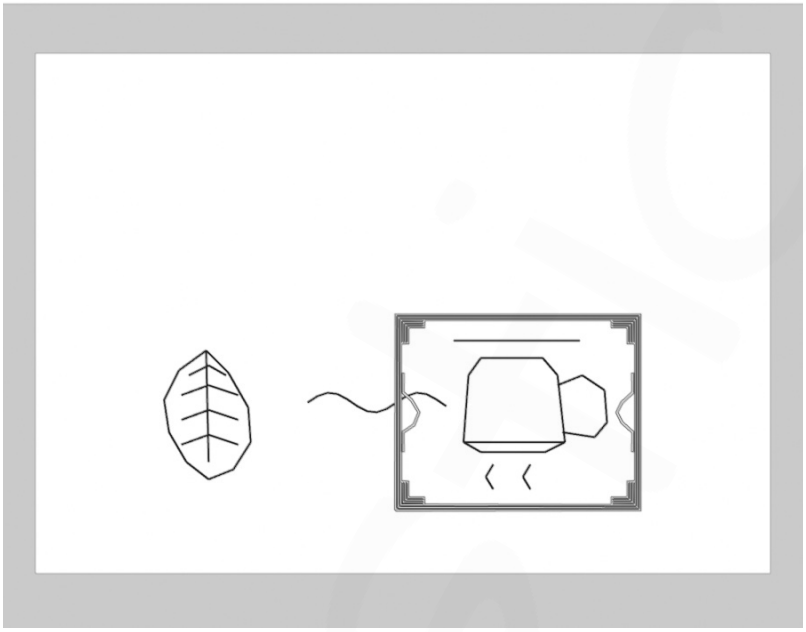
The sheet and drawing are the same. The position of the frame has changed, not its shape. The frame window remains open.

**If it does not work**

If the frame catches on the paper, stop and lift the entire frame higher without bending the PLA. A broken frame must be remade from the start.

# Lower the frame and compare the views — construction details

## View 2: mug



# Finished — check the outcome

**Check**

The outline is closed, flat and approximately 100 × 80 mm. The four corners are wider, and the two decorations permanently touch the band; the center remains open.

**Check**

On the same stationary sheet, identify two different views created by moving the frame. Decide which one you want to show.

**Check**

After cooling, check the edges. Cut only loose strands; an adult helps the child. Put the equipment away according to its instructions and collect the scraps.

**Check**

Store the frame flat, without loading or bending it, in a cool place away from sunlight and heat sources. If the outline or a decoration breaks, make an entirely new PLA frame on W01 and the mat; do not glue or bend the broken area.

**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.