# Toothpick Miniatures

by Alexandre Karadimas

Make your own 1:64 miniatures with common household tools
and materials

Terrain I

3 sizes of trees, including one with a platform for a miniature
Can be dissassembled into components less than 6 cm tall
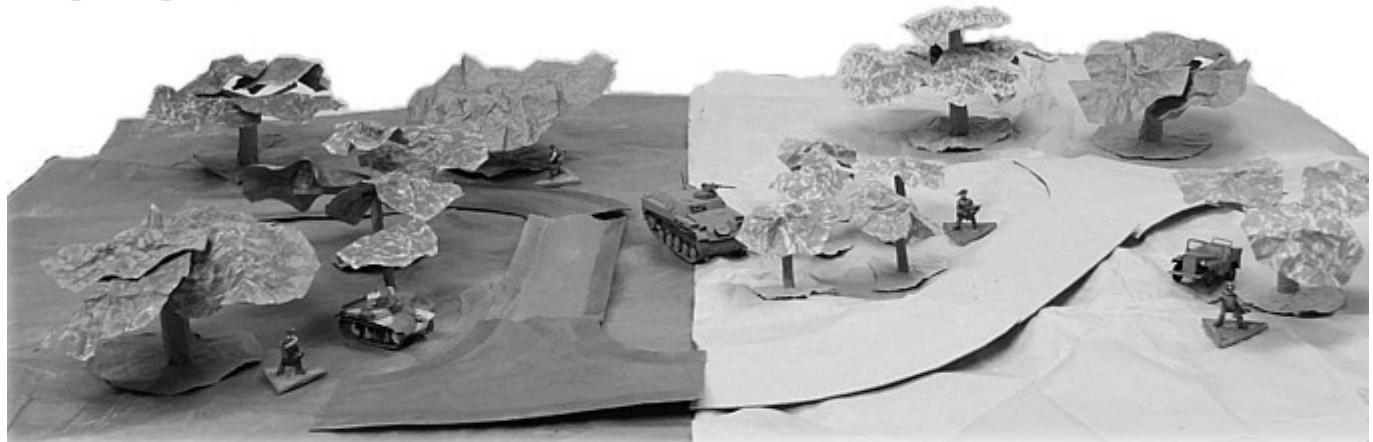
Battle mat — 6 different road elements — Easily stowable with minimal space requirements

Houses and sheds: 8 sizes of walls from 18 mm to 210 mm, using the A4 paper system: the longer wall in one size is the smaller one in the next size
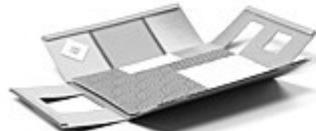
A10 37 x 26 mm

A9 52 x 37 mm

A8 - 74 x 52 mm

A7 - 105 x 74 mm

All houses but the smallest (A11, telephone booth sized) are **foldable**, taking a minimal amount of space when stowed, and easy to protect from dust.
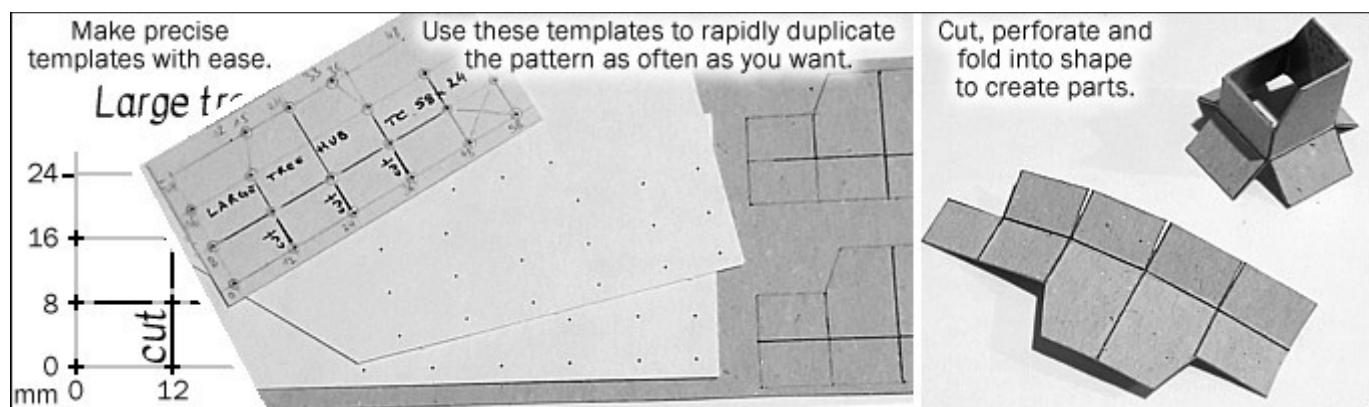
Stackable — Customizeable

Make precise templates with ease.

Large tr...

Use these templates to rapidly duplicate the pattern as often as you want.

Cut, perforate and fold into shape to create parts.

1. Tools

Commonly found at home

- 1 small <u>segmented blade</u> or "snap-off blade" <u>utility knife</u>.
- 1 pair of household <u>scissors</u> to cut paper.
- 1 <u>cutting board</u>, made of a flat piece of wood, MDF, thick plastic or any other suitable material.
- 1 <u>piercing board</u> with a Ø 4 mm (*meaning: of a diameter of 4mm*) hole drilled through it *(see the image "How to make your templates" on page 3)* to make piercing cardboard much easier.

- 1 pair of <u>nail scissors</u> (slim ends are preferable) for cutting paper and thin cardboard precisely.

- 1 <u>pin Ø 0,6 mm</u>, common stationery item.
- 1 <u>thin pin Ø 0,4 mm</u>, typically used to hold cloth while sewing or in newly bought shirts, to make holes with precision. *(see on page 3)*

- 1 <u>mechanical pencil</u> to precisely mark cardboard and paper. *Note: it can't be substituted by a regular pencil because the templates have holes specifically made for mechanical pencil tips.*
- 1 <u>set square in metric</u> or at least a ruler in metric.

- <u>Stationery hinge clips</u> to hold small parts together while the glue dries. *(see Step A06) If you don't have hinge clips, you can hold the pieces together between your fingers until they are glued together.*

- <u>Household glue</u>, in liquid or gel form. Use a toothpick to apply glue to parts.

Recommended additional tooling

- 1 <u>calliper</u> (the very economical plastic variety is sufficient, costing about 3 Euros or US Dollars). *It is useful for assessing the thickness of your materials and makeshift tools.*

Always cut downwards on the cutting board and never towards any part of your body.

**Please don't cut yourself.**

2. Materials

Commonly found for free or nearly free

- <u>Thick cardboard</u> (1,5mm thick, like in delivery pizza boxes) is used for the roads, it is also a source for corrugated sheets (see below).
- <u>Thin cardboard</u> used in packaging (for instance in breakfast cereal boxes or tissue boxes). The thinner the cardboard, the better.
- Different types of <u>brown paper</u> are explained on step A09, page 8.

Soak corrugated cardboard completely into water. After a few minutes, the layers come loose. Carefully peel off the other layers.

Let the corrugated sheet dry on a flatsurface.

Slimmer cardboard has narrower corrugations

14 mm

Sheets of corrugated metal are commonly 900 mm wide. At a scale of 1:64 this translates to 14 mm. Working with these 14 mm sheets leads to more realistic results.

Working on a small scale

The 1:64 scale is at the very limit of where one can operate visually and physically without optical help.

Setting up templates and jigs

Some parts have a simple design and are best drawn in batches, using a ruler. Illustrations will feature an example whenever this is the case.

Other parts have a complex design, which would be too time-consuming to draw from scratch. In these cases we will first make a template, a piece of cardboard with all the markings needed to replicate these parts, as well as indications to modify and position them precisely afterwards.

By using templates, you will be sure to have the same dimensions on all parts.

Measurements will be provided in millimeters and half-millimeters. Some parts will have to be trimmed to fit, proceed by removing thin strips of material at a time.

How to make your templates
1. On a white piece of cardboard, draw a rectangular frame and write the measures on all sides.
2. Use these marks as a grid to position points of the template. Draw the template.
5. Pierce the points as indicated then cut to shape.
6. Label the template. Draw the location of the folding lines with a distinct colour.
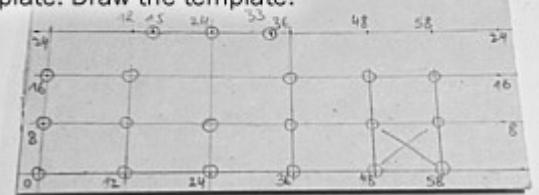
LARGE TREE HUB   TC 58 x 24
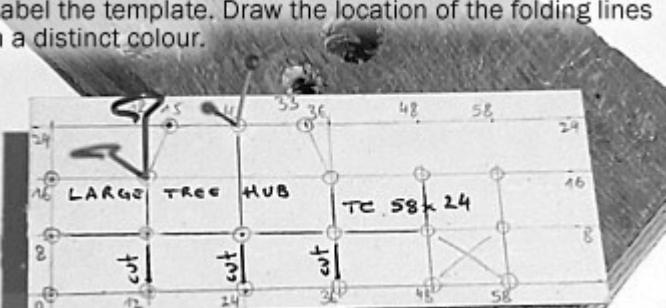
Most templates are on the central pages

Piercing holes on templates: to pierce, first use the Ø 0,4 mm thin pin then enlarge each hole with the Ø 0,6 mm pin, wiggling it until it is wide enough to let the Ø 0,7 mm graphite tip of the mechanical pencil through.

Glue works better on the **porous side** of cardboard packaging. The smooth, printed side is better suited to be painted over.

You can use a **roller pen**, even a depleted one, on the folding lines. This will make folding easier and more precise.

The makeshift nature of these designs makes it possible to use a variety of materials for **decoration**.

Post stamps, snippets from magazines, supermarket leaflets and small pictures on packaging make good **paintings** or art.

The sky in this picture has a nice colour gradient, the building and paveway interesting textures.

The inner side of enveloppes have interesting textures or colours to use as **wallpaper**.

Cake box
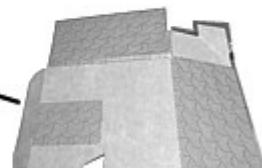
A01 Trunk for the small tree and the medium tree

1. Apply glue on the tab

Fold Fold Cut

2. Glue the tab inside.

3. Press the trunk against a flat surface until the glue has hardened.
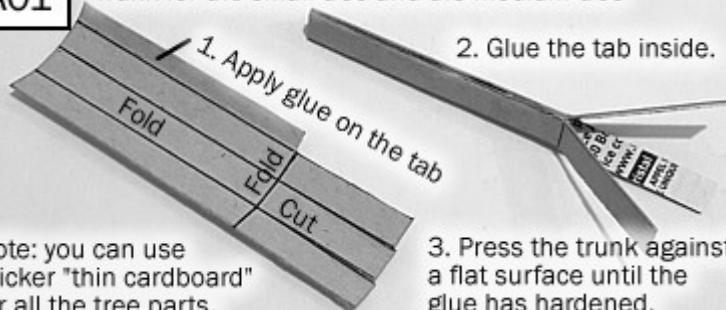
Note: you can use thicker "thin cardboard" for all the tree parts.

The small tree has no branches, glue the "roots" to a piece of thin cardboard and trim to a triangular shape.
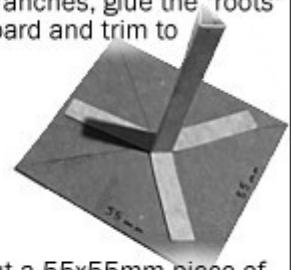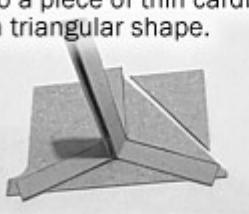
For the medium tree, cut a 55x55mm piece of thin cardboard. Lines to opposing corners intersect in the center, glue the stem over it.

A02 Small and medium tree bark

Cut a 50x25mm rectangle from thin kraft paper.

Roll it into a cylindrical shape, apply glue on a 1 mm strip on the edge, close the cylinder.
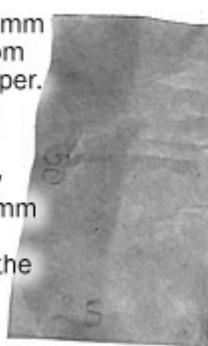
When the glue has dried, crumple the cylinder, then straighten it back into shape (using for instance the stem of a Q-tip). The crumples give it a bark-like texture.
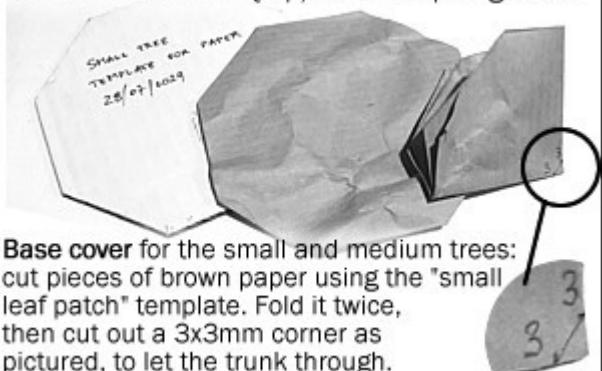
Base cover for the small and medium trees: cut pieces of brown paper using the "small leaf patch" template. Fold it twice, then cut out a 3x3mm corner as pictured, to let the trunk through.
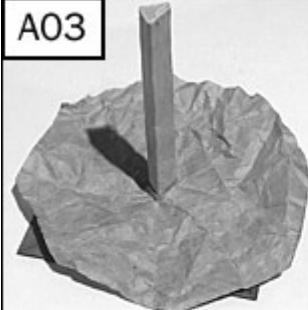
A03 For the small trees, cut the base cover sides to match roughly the shape of the base.

Crumple the paper base cover as well, to give it more texture. Cut away the parts of the "medium tree" base that protrude.

Use the "base cover" template on the folded shape to mark the central hole and to make the cover appear less geometric.
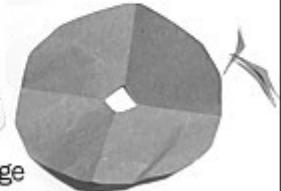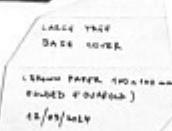
For the large base, use the "large leaf patch" template to get a piece of brown paper and fold it twice.

A04 When you work on the dots, accentuate the position of the two dots that mark where to cut the slit.
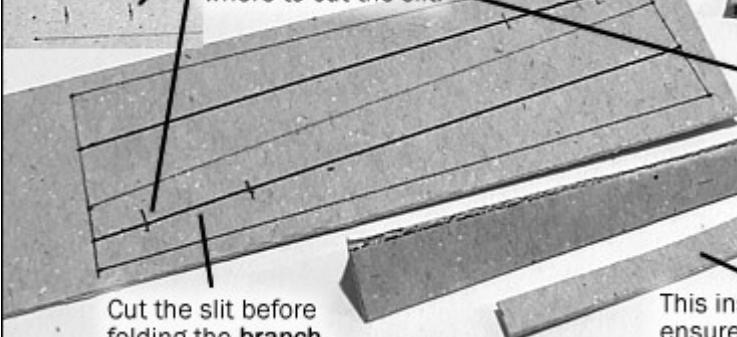
Glue the insert in the middle of the branch.

Leave enough room for the node and for the large tree hub tab (see step A05).

Cut the slit before folding the branch.
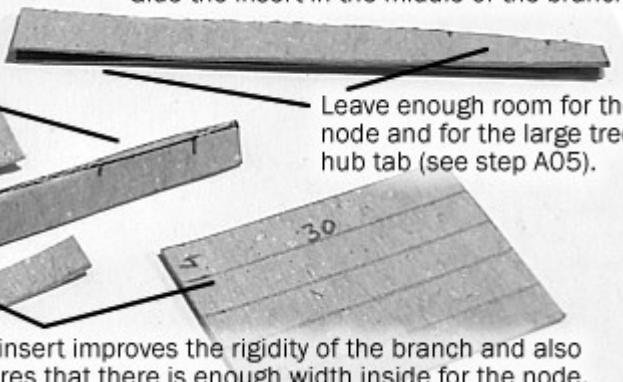
This insert improves the rigidity of the branch and also ensures that there is enough width inside for the node.

A05

Insert the bark cylinder before glueing the branches.

When glueing the branches to the trunk, you may want to also glue them one to another at their base.

TREE NODE TC 20 x 20

TREE NODE - A TC 40 x 40

Small parts like the nodes can be made from scrap pieces, this is why there are two templates for them. It is more efficient to make small parts in pairs. Piercing the base of the slit is better than cutting it off.
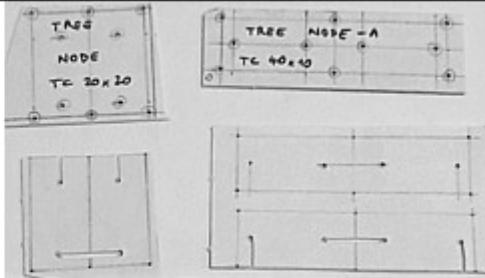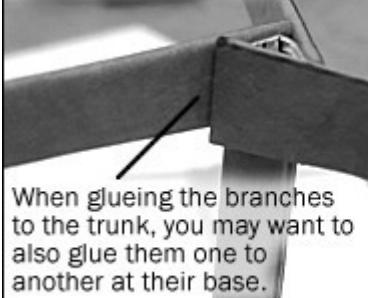
Cut off corners on the top of the node part.

Slide the node into the branch slit from below, and push it outwards.
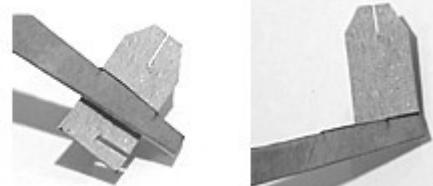
A06

Slide the T-branch in the node's upper slit.

For the medium tree, it is possible to create an upper trunk by wrapping a toothpick in paper until it can be inserted in the trunk's hole.

The large tree is made of three removeable elements: the trunk&base, the hub (the assembly of which can be seen on the front page) and the upper trunk.

Glue the hub tabs inside the branches.
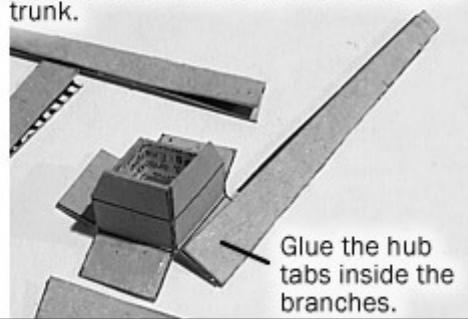
Once the glue in the four branches has dried, glue them to the hub.

A07

Glue the **platform** to the top of the hub.

The plaform prevents the hub to slide down the trunk, it also allows a trooper-sized miniature to be positioned on it.

Cut and draw folding lines on the **upper trunk** part. Apply glue over the dots.
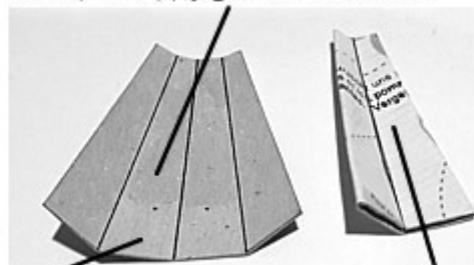
Leave everything under the dots without glue.

Close the shape and let the glue harden.

The upper trunk can be inserted on the hub corner tab, you can use the same type of bark on it as for the large trunks.

(Both not fully inserted here)

A08

Food colouring is used in this design

- The leaf patches on the trees are crumpled, the battle mat is rolled together for storage : this would make regular paint chip off, whereas food colouring gets inside the paper itself.

- Food colouring is very bright on white paper, but gives more natural colours on brown paper.

⚠️

Food colouring will **stain** most materials it gets in contact with: textile, wood, even the cement between bathroom tiles.

Food colouring is also very economical and easy to procure, this set costs 2€ at the local supermarket.

Terrain Templates Scale 1:64 Page 1/2

Flip it along this side

+ Pierce for 0,7mm

⊕ Special purpose

|—| Folding line

Large tree trunk TC - 90x48

48 40 30 20 10 0 mm 0 55 90

cut
cut
cut
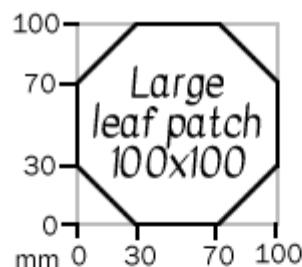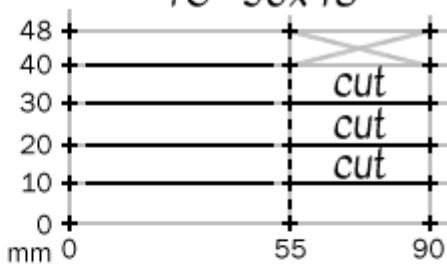
Small tree trunk TC - 75x22

22 18 12 6 0 mm 0 50 75

Large leaf patch 100x100

100 70 30 0 mm 0 30 70 100

Medium 85x85

85 60 25 0 mm 0 25 60 85

Small 70x70

70 50 20 0 mm 0 20 50 70
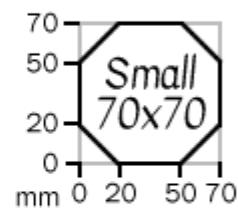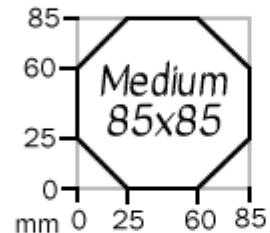
Tree branches x2 TC - 60x28
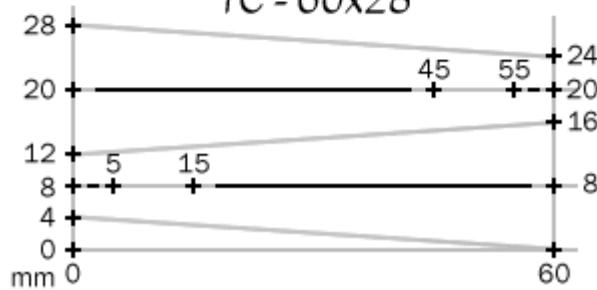
28 20 12 8 4 0 mm 0

5 15

45 55

24 20 16 8

60

Branch nodes x2

10 5 0 mm 0 2 15 20 25 38 40

TC - 40x10

TC - 20x20

20 15 2 0 mm 0 5 10 15 20

Large tree hub TC - 58x24

15 33

24 16 8 0 mm 0 12 24 36 48 58

cut cut cut

T-Branches x2 TC - 60x15

15 10 5 0 mm 0 20 40 60

cut

Large tree base cover

50 35 20 4 0 mm 0 4 14 41 50

50

9
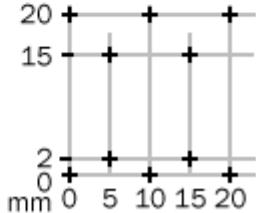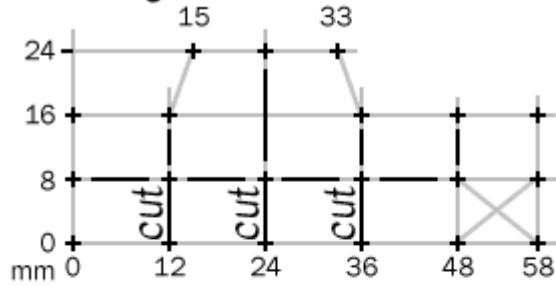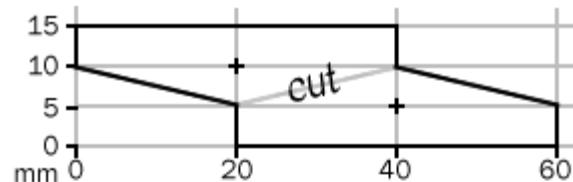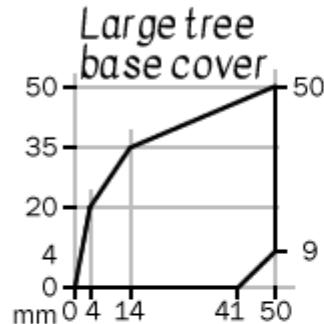
Large tree bark Lower & upper

54

10 54

Brown paper 64x54

0 mm 0 64

16 21 26 31 36

50

Upper tree trunk

Apply glue

from here up

TC - 52x50

10 4 0 mm 0 12 21 26 31 40 52

4

House corner tabs

32 28 24 20 16 12 8 4 0 mm 0 10 22 34 44

cut cut

cut

cut cut

House positioning & corner

30 28 26 14 0 mm 0 2 12 16 22 32 34

Diagrams on this page are not all at the same scale

- 6 -

Flip it along this side

+ Pierce for 0,7mm

⊕ Special
purpose

|——| Folding line

Road - Straight

Kraft paper - 210 x 90

90
82
68
45
22
8
0
mm 0   105   210

60°   90°   137 *Road curves* 211
0 mm   69   129   151 *compass* 197   219

Draw a line, use the compass with both ends
as the center in order to find the intersection.
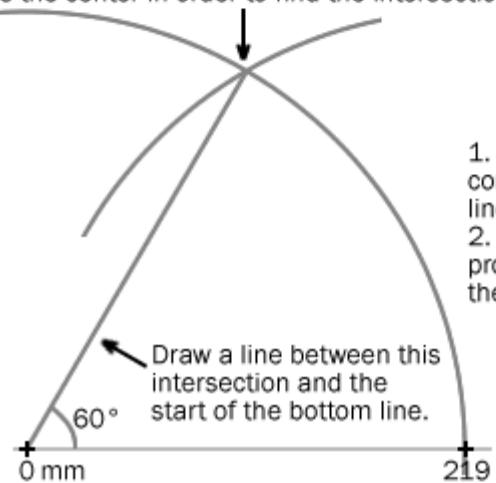
1. Use the
compass to draw
lines.
2. Repeat the
procedure to make
the "rib" templates.

"60° outer rib"
template

"60° inner rib"
template

Draw a line between this
intersection and the
start of the bottom line.

60°
0 mm   219

0 mm   219

Template for
the paper

Use the compass with a different
center for the 90° curve templates.
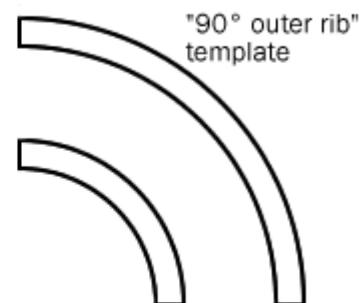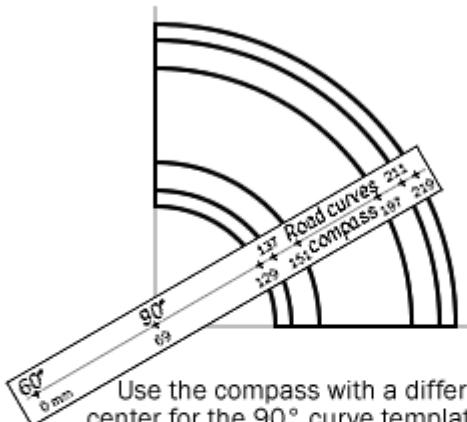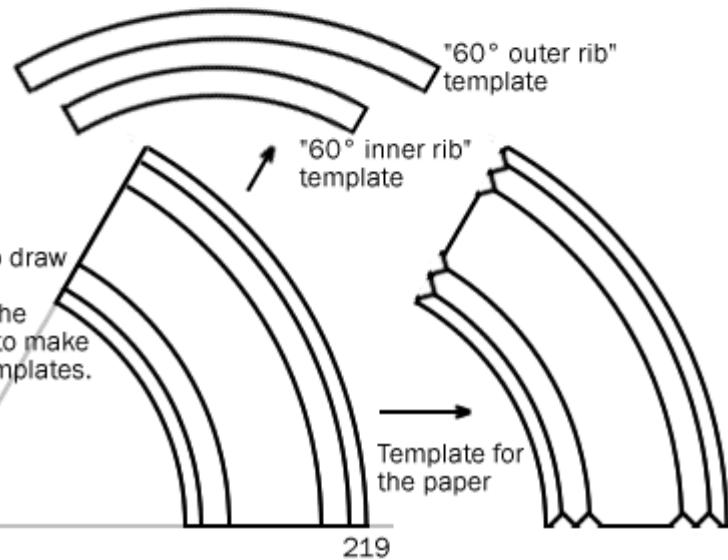
"90° paper" template

"90° outer rib"
template

"90° inner rib"
template

These are observation ports
to align the bend of the
template with the bend of
the material.

This represents the 2
mm wide bend in the
material (see Step D01)

*House
walls*

A5 - 210x148
A6 - 148x105
A7 - 105x74
A8 - 74x52
A9 - 52x37
A10 - 37x26
A11 - 26x18

40
35
5
0
mm
-14
-17

0   37   52   74   105   148   205   210
16   21   36   58   89   132   189   194

37   52   74   105   148   210
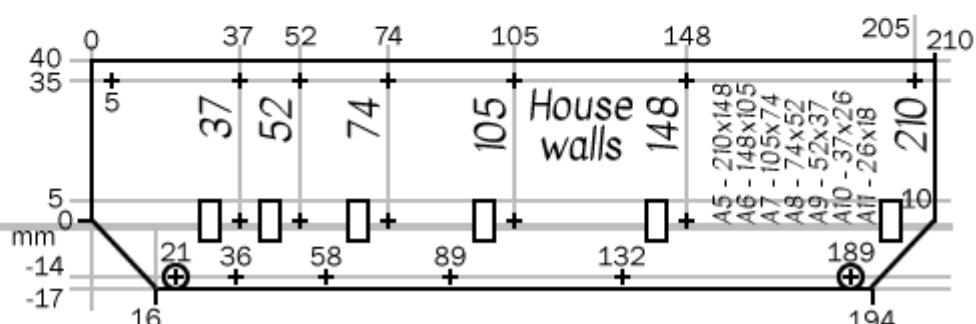
Diagrams on this page are not all at the same scale

A09 Two common sources of large pieces of **brown paper** are Kraft packing paper (here named KPP) and brown filling paper (BFP).

KPP   BFP

You can use either for the tree leaf patches.

The same colour, Pale Green (see A10 below), has been applied to:
- a road made of KPP
- a road made of BFP
- a battle mat made of KPP

KPP   KPP   BFP

BFP

Natural BFP looks like sand in its colour and texture.

The same Pale Green colour appears lighter and homogenous on BFP, darker and uneven on KPP.
It is recommended to use the same material for the road parts and the battle mat.

A10 **Setup** to paint with food colouring

Put a garbage bag on your table as a first protective layer, then newspapers or supermarket adverts as a second layer.

Water to add to the mix

Large water bowl to clean the brushes

Drop dispenser for the water

Plastic cups are connected to metal lids with adhesive tape to weigh them down.

In this design, you can make trees and battle mats for the **temperate** climate environment and the **desertic** or **semi-arid** climate environment.

This can be achieved using the brown paper's natural colour and two **colour mixes:**
Pale Green: 1 part blue, 1 part yellow, 2 parts water.
Intense Green: 2 parts blue, 1 part yellow, no water.

A11 Temperate climate

The second layer of Intense Green is almost drybrushing: let very little colour on your brush and use its side, lightly, so that only the raised parts get some colour.

Semi-arid climate

First layer: apply the Pale Green colour from a central "donut" (in order not to saturate the center) to the border. This way, most of the surface is covered but some natural brown remains.

Use the "drybrushing" technique with only Pale Green, so that a large part of the surface remains in its natural brown colour.

A12 Some **paper napkins** have designs you may find interesting to use for your leaf patches.

This layer is quite fragile, glue it on a regular sized leaf patch, then fold the excess and glue it on the underside.

Napkin leaf patch

110 x 110

mm 0   30   80 110

Only one layer is printed, remove the others.

Cut off the parts you want using this template.

This layer is also quite transparent, experiment with patterns and colours on the support paper to obtain more texture or details.

B01
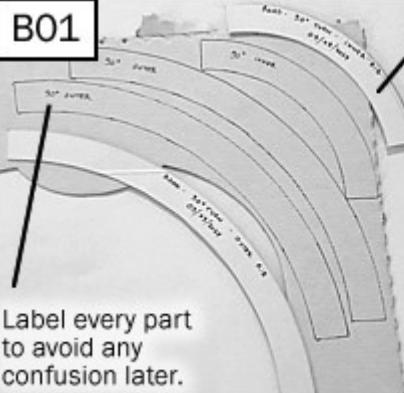
Use the templates to mark and cut the "ribs" parts of the **roads** from corrugated cardboard. It is recommended to use cardboard of the same thickness for all these parts.

Draw the straight parts directly on the cardboard.

Make sure that the straight lines follow the direction of the corrugation so that they won't bend.

Label every part to avoid any confusion later.
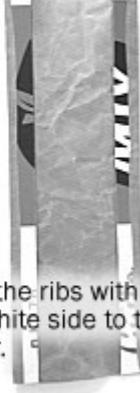
Glue the ribs with the white side to the paper.

B02

The templates for the paper can be used for the more complex shapes as well (T-, X- and Y-intersections).

Y: step 1   Y: step 2   Y: step 3   T: step 1   T: step 2
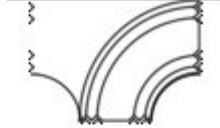
Straight road template
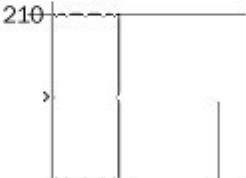
X: step 1   X: step 2   X: step 3   X: step 3   X: step 4
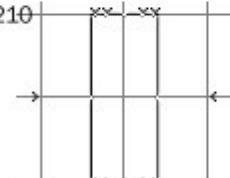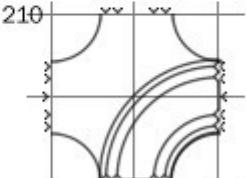
B03

Cut the outer parts of the paper in tabs about 5 mm wide, and glue them underneath the ribs.

Immediately make a visual check while the glue is still fresh in order to to correct problems such as these.
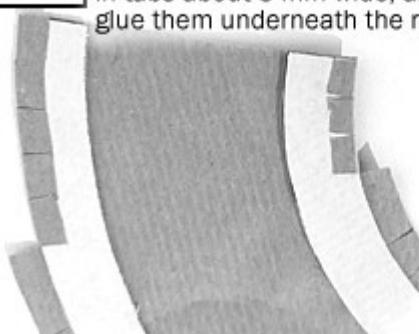
Accentuate the limit between the road itself and its sides, formed by the ribs.

The colour of the **road** indicates its nature (natural brown: dirt road, grey colour: asphalt road). The colour of its **sides** indicates the climate (green: temperate, natural brown: semi-arid or desertic).

C01

To built a **battle mat** to your specifications, assemble paper strips using glue or adhesive tape.

(This is the underside)

If possible, colour the battle mat **outside**. If this isn't possible, you can built a protective paint mat from large garbage liners (50 liters or larger): 1. take two liners and cut away the bottom.

2. Cut one side and unfold. Connect the two unfolded liners using packing tape.
3. Add any intermediate layer you can between this mat and the rest of the room.

C02 Don't saturate the brush and paint slowly to avoid spraying colour.

6ml of blue, 6ml of yellow and 12ml of water provides enough colour to cover more than 0,5 square meter.
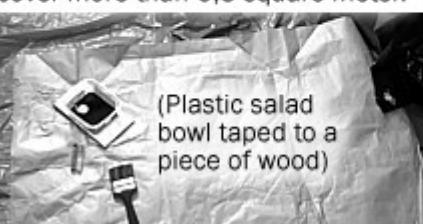
(Plastic salad bowl taped to a piece of wood)

Roll the finished part onto itself. The colour dries in less than an hour. Wipe off any colour drops using cleaning alcohol.

Roll battle mats to store them. Roads (and road templates) can be stored in A5 enveloppes.


Part D : houses and sheds

D01

These dots make it easier to draw a straight segment bottom.

21
16

The design for the houses uses the packaging's own folding line. To start building the template, place the zero where the folding line intersects with the flat surface.
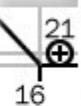
(Corner positioning dots)

Using the template, measure then cut the segments that will become the house's walls.

HOUSE POSITIONING & CORNER PRODUCTION 19/05/2024
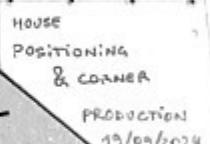
Use the corner template to draw the missing corners.

D02

Use the positiong dots to adjust the length of the middle strip.

Make several 2 mm wide strips of Thin Cardboard for this design.

These 10 x 2 mm parts are standard. Make a dozen of them first, then convert leftover cuts into them afterwards.

Glueing the 10 mm parts just besides the dots creates leeway for the connectors to slide in.
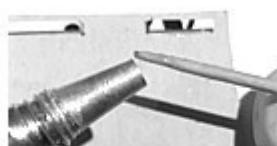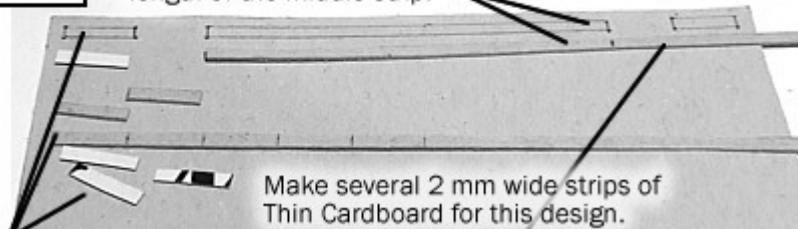
Use a toothpick to apply glue precisely. Glue the porous side of the part against the wall part.

(2) Glue the 4 mm strip to the 2 mm parts so that its top side is a the same level than the wall part.

②

①
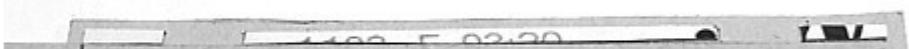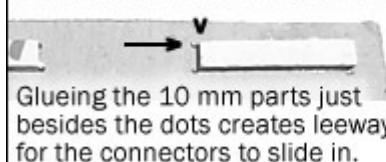
(1) Adjust the length of a **4 mm** wide strip to the limits of the 10 mm parts, leaving 2 mm free on both sides.

D03 Glue the walls to the baseplate, which is smaller by 2 mm on both dimensions.

Nominal	105 x 74	
-2	-2	-2
Baseplate	103 x 72	
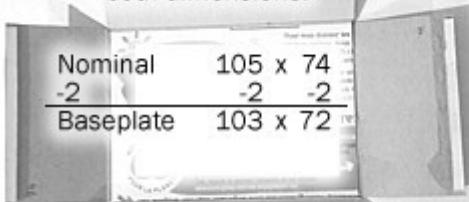
Write down the size of the house where the front side is. Protect the label from paint with adhesive tape.

(Front)

The angle is less than 45° to allow for tolerances in cutting and assembly.
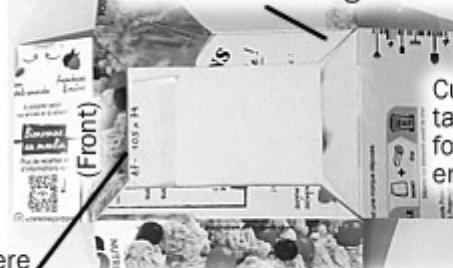
Cut off the tab corners for easier entry.

The template allows you to make four connectors at once, enough for one floor.

HOUSE CORNERS 19/05/2024

D04 — Floor plans

Roof connector — 7,5 12 / 12 / 7 / r=11 / 0 2,5 10 17,5 / -1,5
Inner door

Terraced house Ground floor — WC, Staircase, Hall, Living room, Kitchen
(dimensions: 74, 31, 48, 71, 58, 50, 42, 22, 21, 44, 30, 105 / mm 0 31 48 71 105)

Terraced house First floor — Bathroom, Staircase, Bedroom 1, Storage, Bedroom 2
(dimensions: 74, 31, 53, 71, 58, 50, 42, 62, 26, 21, 105 / mm 0 31 53 71 105)

Kitchen / TERRACED HOUSE GROUND FLOOR MIRRORED / Hall / Living room / Toilet / Staircase

Use cardboard which is white on both side when you draw the templates for the floor plans. This way the backside can be made into a mirror floor plan, like those used in terraced houses.

WINDOW / OUTER DOOR / TOILET

Use the floor plan to mark the positions where doors and windows have to be cut out from the walls, using the template below.

Window/door template: 14, 7, 0 / 3, 11 / 0 15 30

D05
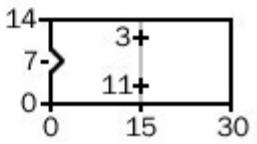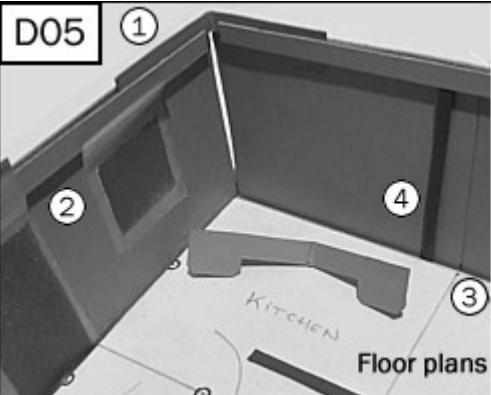
(1) The removeable connectors allow the design to be foldable and stored flat.
(2) You can spray colours on the flattened house. Protect the openings with Scotch tape from the inside so that their sides have the same colour as the outside.
(3) If you wish to decorate the walls, you can use the floor plan to draw the limit between the rooms.
4) A 36 x 2 mm part (in a brick colour for instance) can be used to materialise this limit.

Floor plans

KITCHEN
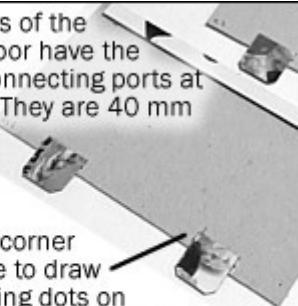
The walls of the upper floor have the same connecting ports at the top. They are 40 mm high.

Use the corner template to draw positioning dots on the bottom side as well. Glue 8 x 8 mm tabs, aligned on the top dots.

D06

Left gable: 19,5 / 15 / 10,5 / 31,5 29 27,5 / 0mm 26 52
Middle gable: 14,5 / 11,5 / 8 / 22,5 21 19,5 / 2 0 0mm 18,5 37
Right (148 mm roof pitches): 51 / 39 / 26,5 / 89 83 78 / 8/12 pitch, 6/12 pitch, 4/12 pitch / 2 0 0mm 74 148

Lower left: 26,5 / 20,5 / 14,5 / 44,5 41,5 39 / 2 0 0mm 37 74
Lower middle: 37 / 28 / 19,5 / 63 58,5 55,5 / 2 0 0mm 52,5 105
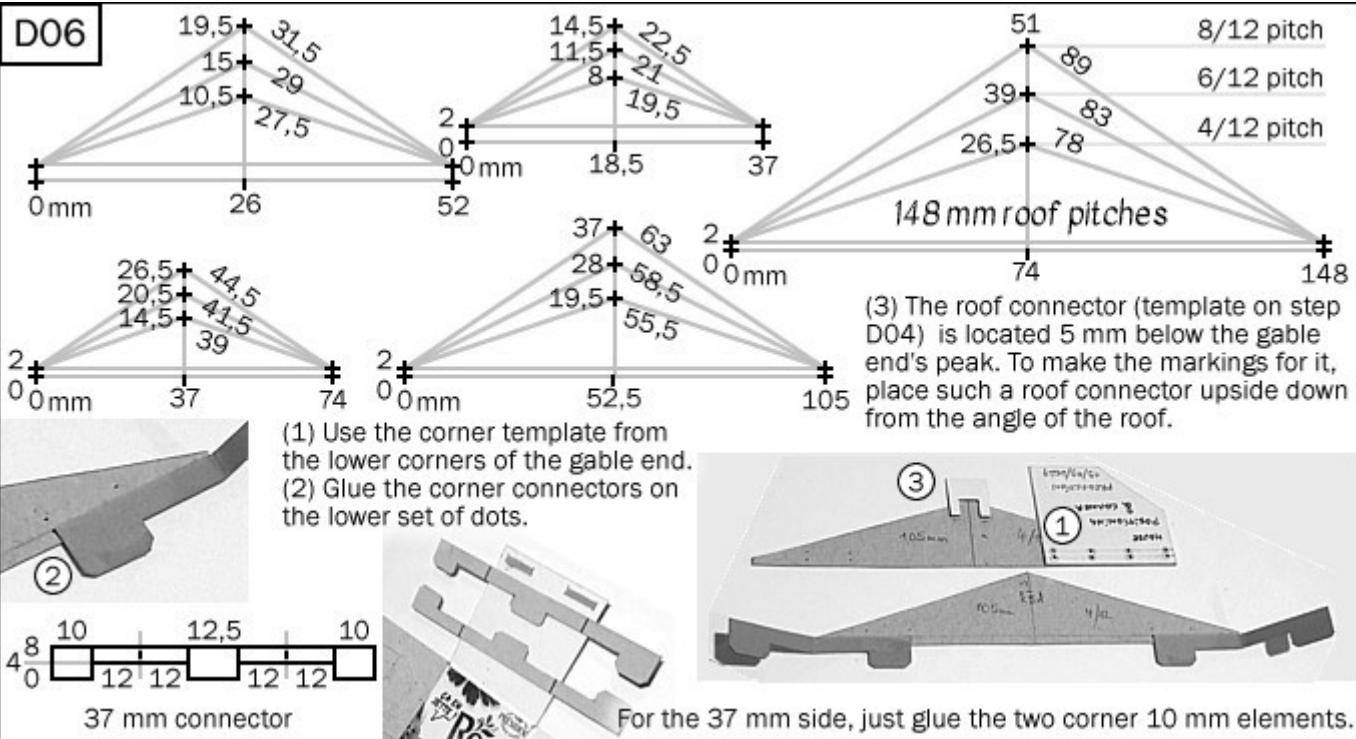
(3) The roof connector (template on step D04) is located 5 mm below the gable end's peak. To make the markings for it, place such a roof connector upside down from the angle of the roof.

(1) Use the corner template from the lower corners of the gable end.
(2) Glue the corner connectors on the lower set of dots.

37 mm connector: 8 4 0 / 10 12 12 12,5 12 12 10
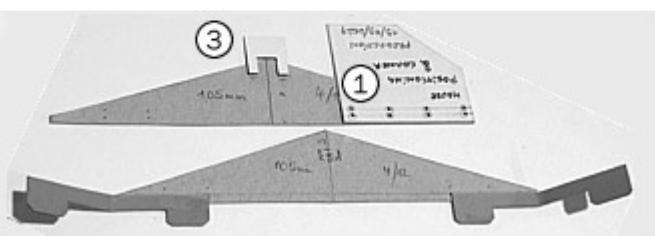
For the 37 mm side, just glue the two corner 10 mm elements.

D07

NOMINAL 74 + 5 + 5
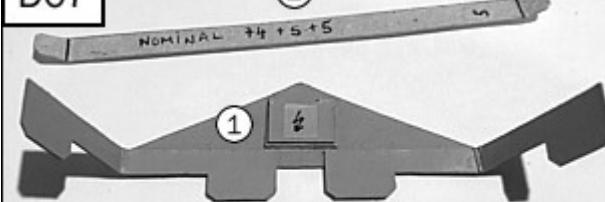
(1) Trim the roof connector's base until it fits, then glue it in place. Glue a 8 mm wide cover piece over it, here it is used as an electric junction box.

(2) The **beam** is a 5 mm wide strip of nominal length with two 5 mm long, slightly V-shaped tabs.

By connecting both gable ends with this beam, the side remain at a constant distance. This allows to simply place the roof over the house (3).
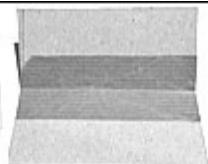
The roof is made of two panels, each 2 mm longer than nominal and 2 mm longer than the hypothenuse (Step A06). Draw a folding line on a piece of kraft paper and glue each panel to it.

83
78

D08 Removeable floors

NOMINAL +2 | 105 × 74 +2 +2
FLOOR PLATE | 107 × 76

FLOOR CORNER

Cut as tabs

Kraft paper: Nominal+2+4+4

4 mm

3 NOMINAL
3 NOMINAL
3 NOMINAL
3 NOMINAL

Draw folding lines

(1) Glue the corner tabs to their other side.

(2) Cut the hole in the kraft paper except on the folding line.
(3) Fold and glue this part to the side.

Increase the rigidity by glueing the 3 mm strips to the sides, on the inside. Compare a reinforced side (5) with a side without reinforcement (4).

The side of these floors keep the walls underneath together while the upper walls are being inserted.

Use the "Floor corner" template to draw notches on the cardboard. Cut the notches before glueing the part to the kraft paper.

"Mezzanine" floors allow you to use several floors at once during the game.

(6) These adjustable planks are glued to tabs on the cardboard floor that swivel along a folding line.

D09 Use images (1) and (2) to see if your templates and part are correct.

Wall side

Staircase

Fold

Hall side

(3) Notice the "front" and "rear" side of the box are not symetrical.
(4) Use pieces of cardboard to glue these sides together.

(5) Fold the steps **risers** and glue them to their corresponding notches on the other side. (6) Trim the excess with nail scissors.
(7) Use the template to draw the lines for the **treads** but prolong the lines. Cut off the pointy end. The larger tread parts will allow you to offset them relatively to the risers (8), creating a bullnose.

(9) The lines are drawn on the porous side but the part will be glued on its glossy side. These numbers help during assembly.

mm 4 10 16
16
12
6
0