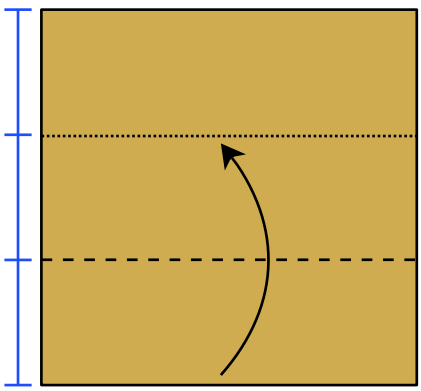
Modular Star Unit

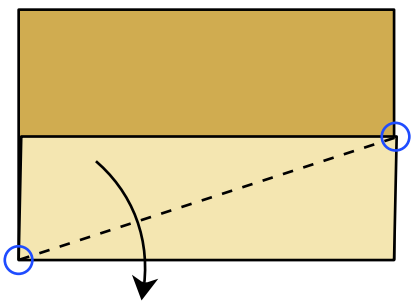
First time: 15cm/6''

#128

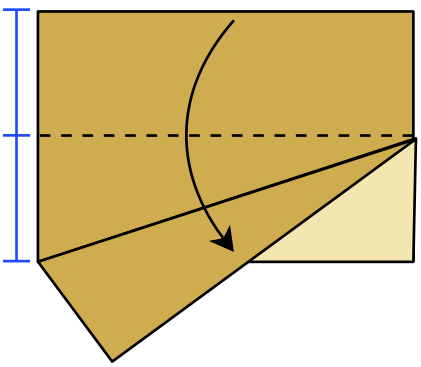
This is unit that can be used to generated many different modular stars. Note that these stars are not stellations, because a stellation requires the face of the star to be in the same plane as faces of the underlying solid, but these stars will not have the exact angles needed for this.



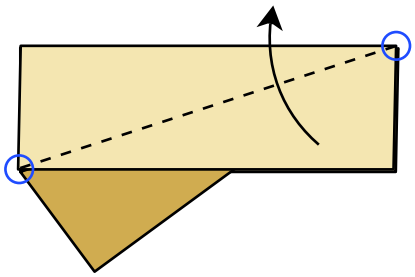
1. Fold the bottom edge up, dividing the height of the square into thirds as shown.



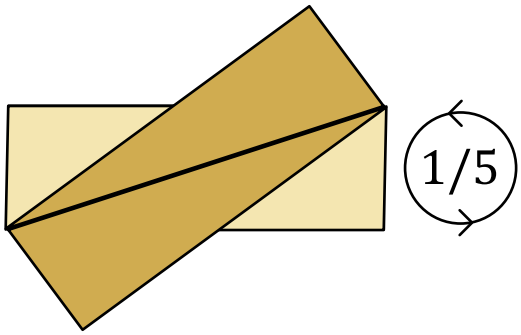
2. Fold the raw corner over, so that the fold-line goes between the circled intersections.



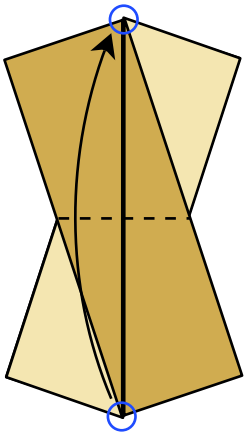
3. Fold the top edge down to lie directly on the partially covered folded edge.



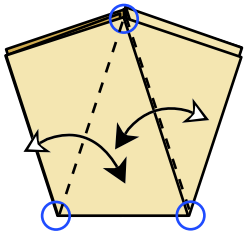
4. Fold the raw corner over, so that the fold-line goes between the circled intersections.



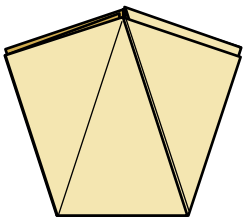
5. Rotate the paper so that the slanted folded edges become vertical (approximately 1/5 of a turn).



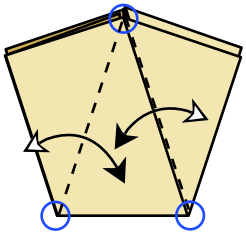
6. Fold the bottom half on top of the top half.



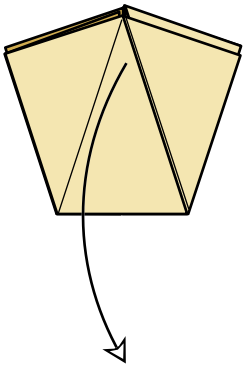
7. Fold and unfold fold-lines which go between the indicated intersections.



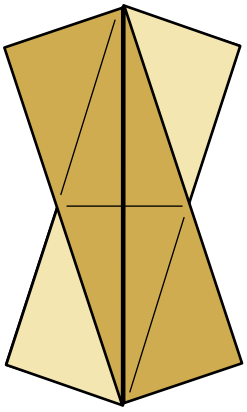
8. Turn the paper over.



9. Fold and unfold fold-lines which go between the indicated intersections.

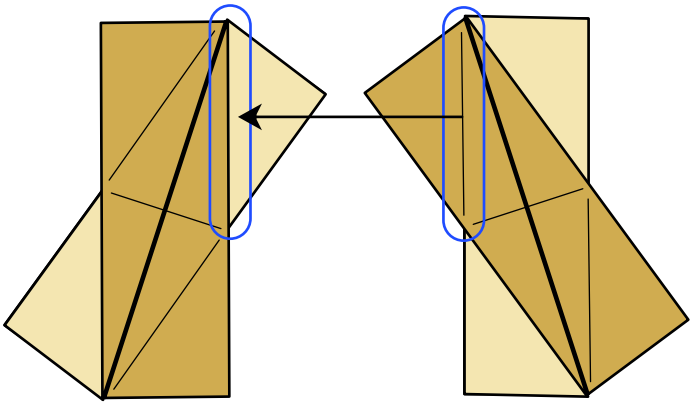


10. Unfold the top flap.

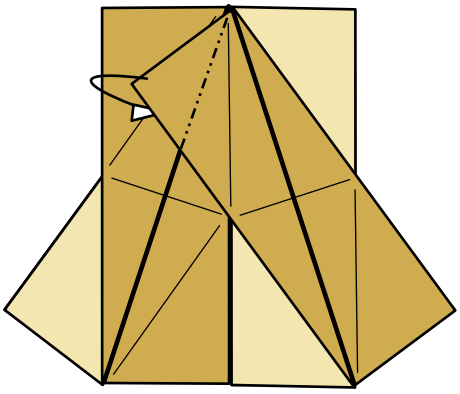


One completed unit. Refer to the table on page 5 to determine how many units you need to make for your desired star.

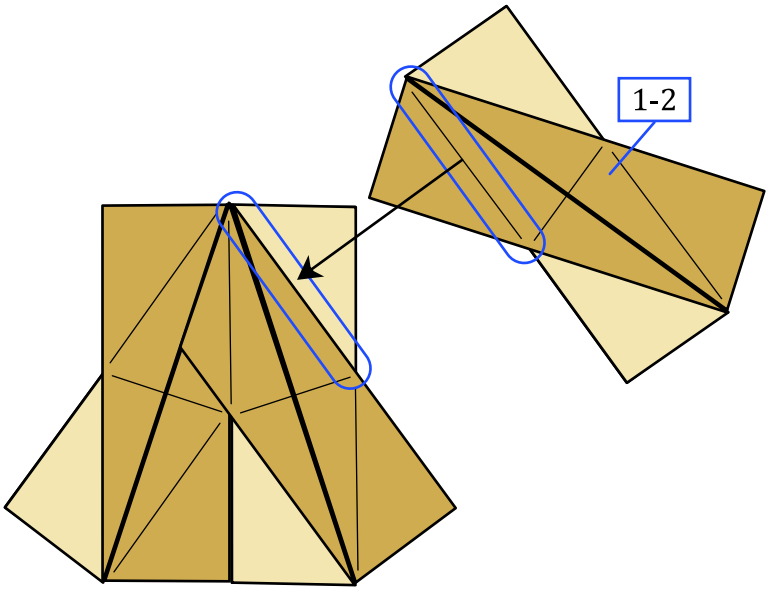
Modular Star Unit Assembly



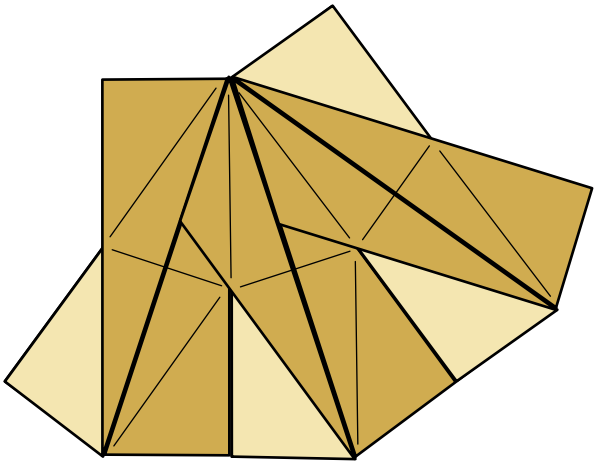
1. Hold two units in the orientation shown. Slide the right unit on top of the left unit until the indicated crease on the right unit lies directly above the indicated raw edge on the left unit.



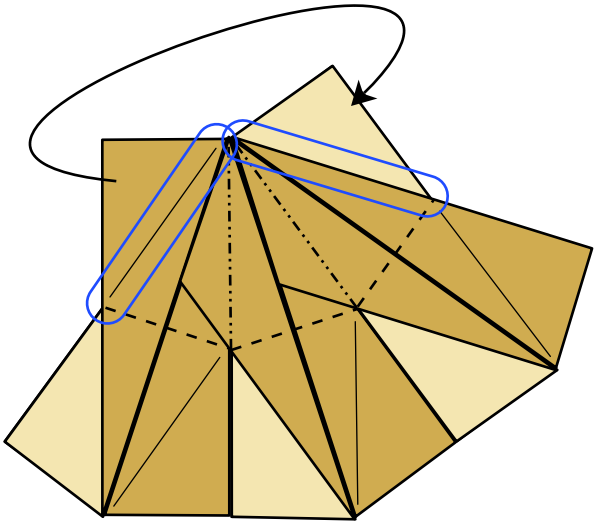
2. Fold the raw corner of the right unit behind, tucking it underneath the folded edge of the left unit.



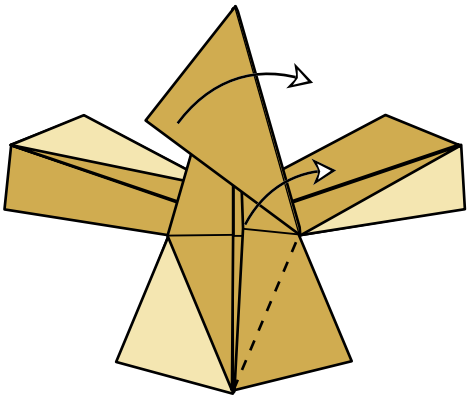
3. Repeat steps 1 and 2 by adding another unit on the right.



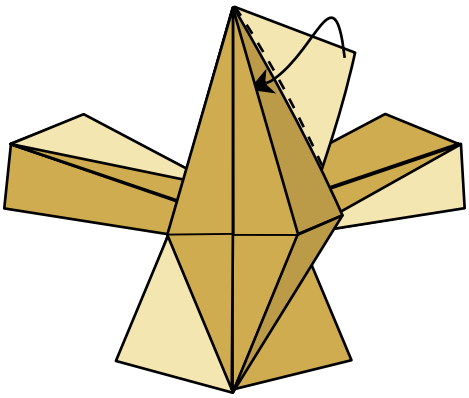
4 (optional). You may wish to add further units by repeating steps 1 and 2 more times, depending on the underlying solid for the star. Refer to the table on page 5 for your options. These diagrams will proceed for an octahedral structure, where this step is not needed.



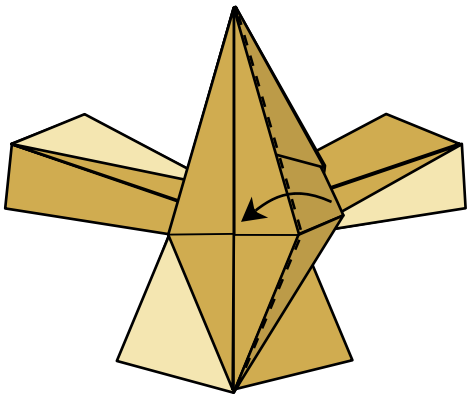
5. Pinch the valley and mountain folds shown so that the units become three-dimensional, then align the indicated crease on top of the indicated raw edge.



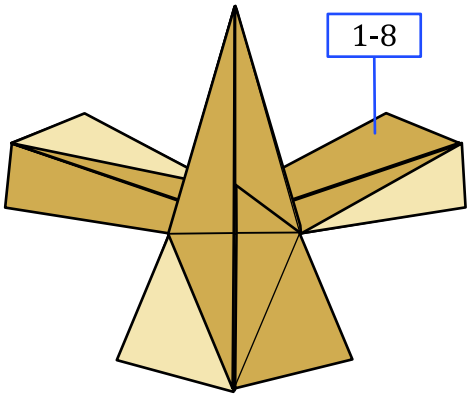
6. Unfold the folded edge shown.



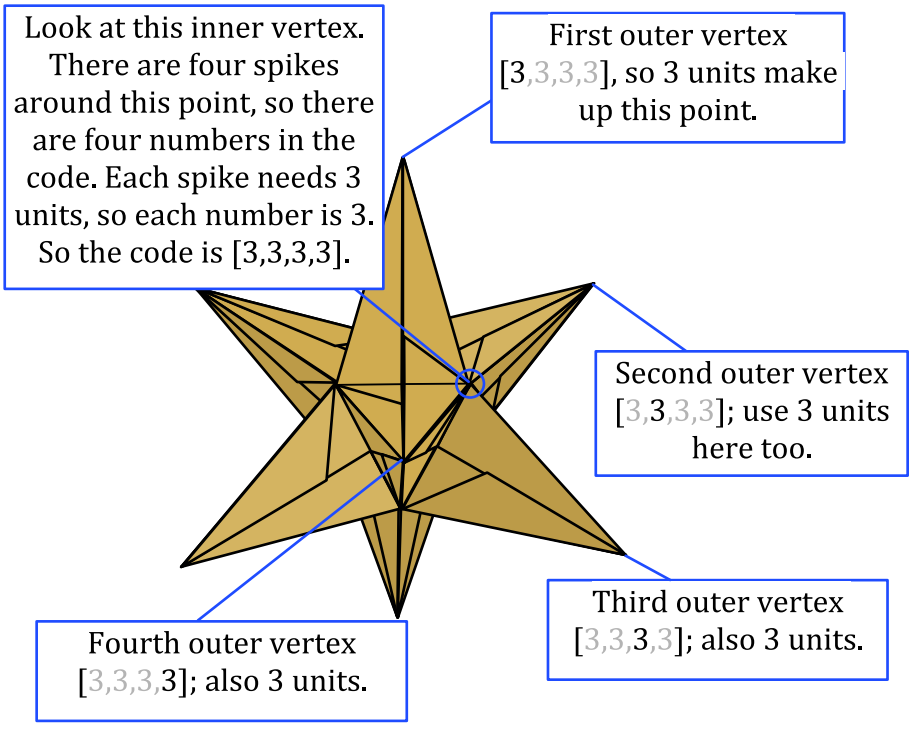
7. Fold the raw corner into the pocket shown.



8. Fold the edge back down.



9. Repeat steps 1 to 8 until you have added the desired number of units and completed your star.



An example using the vertex code column in the table on the next page. Start at the inner vertex and consider the points/outer vertices around it.

Underlying polyhedron	Image	Total units (number of edges of the solid)	Vertex code
Tetrahedron		6	[3,3,3]
Octahedron		12	[3,3,3,3]
Icosahedron		30	[3,3,3,3,3]
Cube		12	[4,4,4]
Dodecahedron		30	[5,5,5]
Truncated Tetrahedron		18	[3,6,6]
Cuboctahedron		24	[3,4,3,4]
Truncated Cube		36	[3,8,8]
Truncated Octahedron		36	[4,6,6]
Rhombicuboctahedron		48	[3,4,4,4]
Truncated Cuboctahedron		72	[4,6,8]/[4,8,6]
Snub Cube		60	[3,3,3,3,4]
Icosidodecahedron		60	[3,5,3,5]
Truncated Dodecahedron		90	[3,10,10]
Truncated Icosahedron		90	[5,6,6]
Rhombicosidodecahedron		120	[3,4,5,4]
Truncated Icosidodecahedron		180	[4,6,10]/[4,10,6]
Snub Dodecahedron		150	[3,3,3,3,5]
Johnson solids* https://en.wikipedia.org/wiki/Johnson_solid			(not vertex uniform)

*Due to the angles of the unit, the Johnson solid cannot have any face which has more than 10 sides.