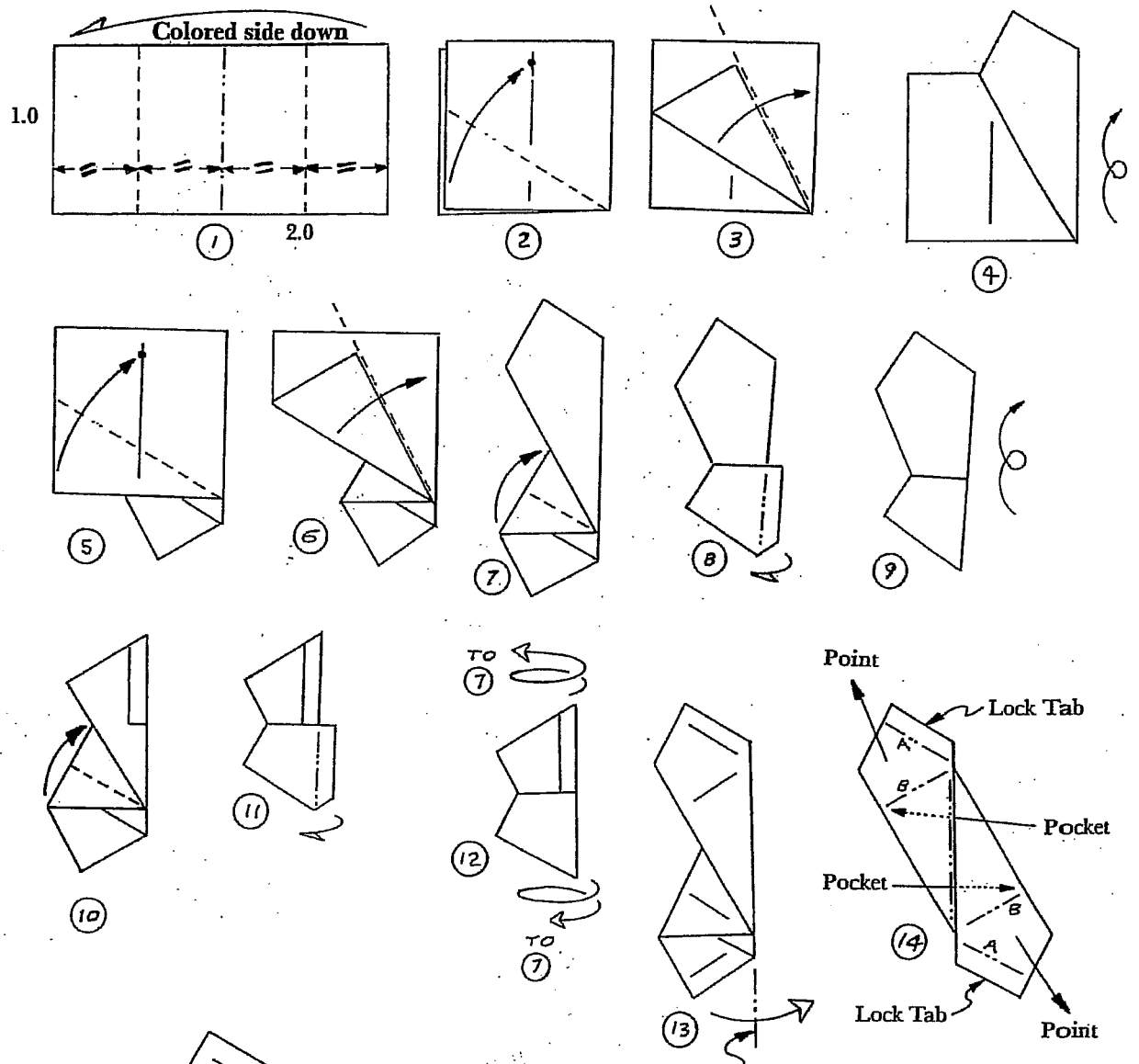
Triangle Edge Module

by Lewis Simon and Bennett Arnstein

Unfold mountain crease made in FIG. 1. Crease A on entering module lines up with crease B on receiving module. Crease B on entering module lines up with mountain crease along diagonal seam on receiving module. This module makes polyhedra with flat equilateral triangle faces. The module corresponds to an edge of the polyhedron. Most polyhedra will require the use of the lock tab. If it is not needed, fold it flat against the point tab.



(x12 = OCTAHEDRON)

x6 = TETRAHEDRON

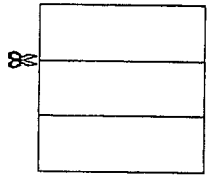
x30 = ICOSAHEDRON

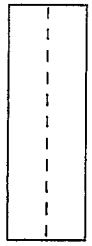
Five Intersecting Tetrahedra

This origami model is a real puzzle! But first we'll start with the **one tetrahedron** made from Francis Ow's 60° unit [Ow86].

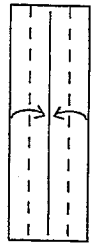
Francis Ow's 60° unit

This requires 1 × 3 paper. So fold a square sheet into thirds and cut along the creases.

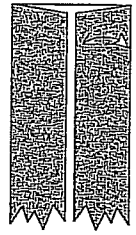




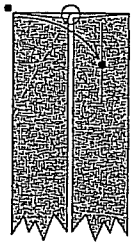
(1) Crease in half lengthwise.



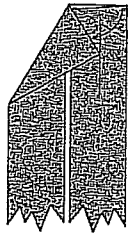
(2) Fold the sides to the center.



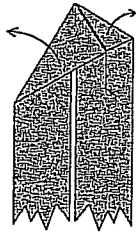
(3) At the top end, make a short crease along the half-way line of the right side.



(4) Fold the top left corner to the pinch mark just made and at the same time make sure the crease hits the midpoint of the top...



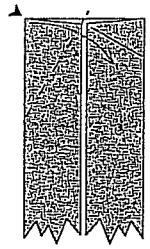
(5) ...like this. Fold the top right side to meet the flap you just folded.

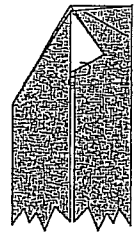


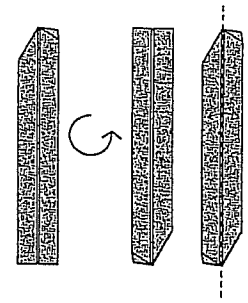
(6) Undo the last two steps.

project Origami

ACTIVITIES FOR EXPLORING MATHEMATICS





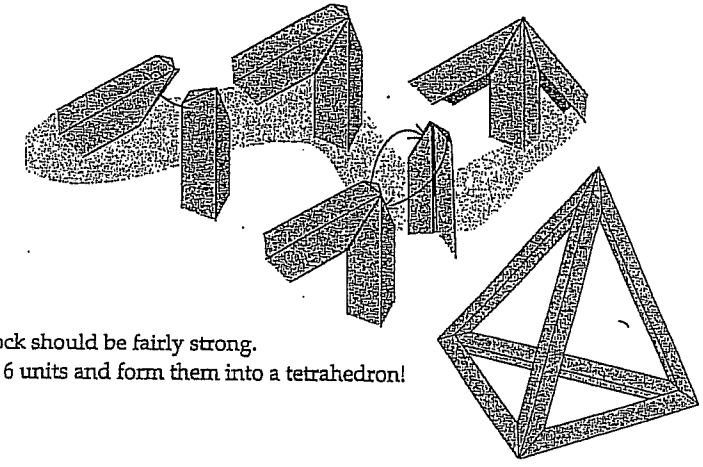


(7) Now use the creases made in step (4) to **reverse** the top left corner through to the right. This should make a white flap appear...

(8) ...like this. Tuck the white flap underneath the right side paper.

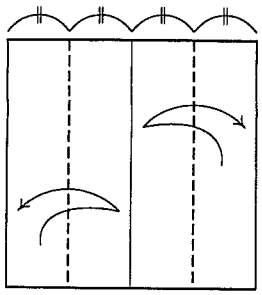
(9) Now rotate the unit 180° and repeat steps (3)–(8) on the other end. Then fold the whole unit in half lengthwise (to strengthen the spine of the unit) and you're done!

Locking the units together: Three units make one corner. Make sure to have the flap of one unit **hook** around the spine of the other!

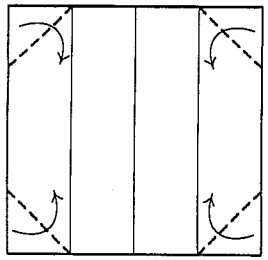


The lock should be fairly strong.
Make 6 units and form them into a tetrahedron!

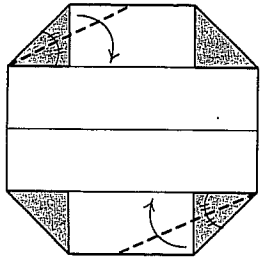
Snow-Capped Sonobe 1



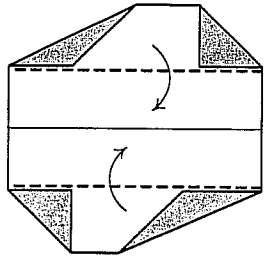
1. Cupboard fold and open.



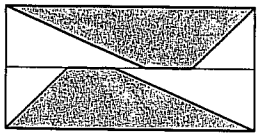
2. Fold corners, then rotate 90°.



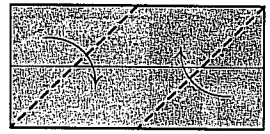
3. Fold corners to bisect marked angles.



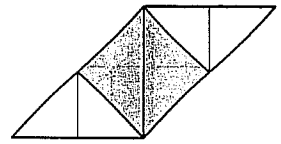
4. Re-crease folds from Step 1.



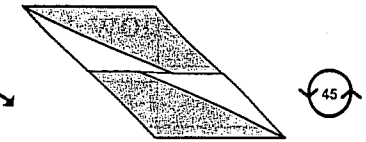
5. Turn over.



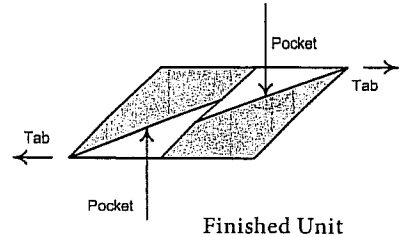
6. Fold corners.



7. Turn over.

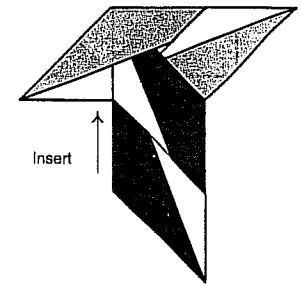


8. Rotate.

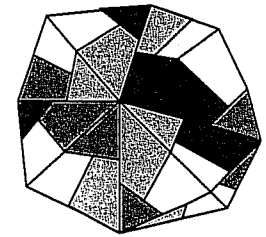


Finished Unit

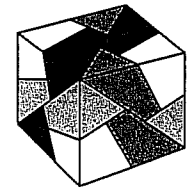
Assembly



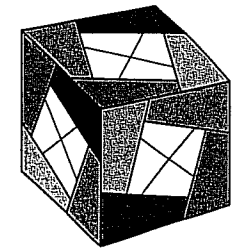
Refer to pages 2–5 to determine how many units to fold, the crease pattern on the finished unit, and how to assemble.



12-unit octahedral assembly



6-unit cube assembly



12-unit large cube assembly

Marvelous Modular Origami

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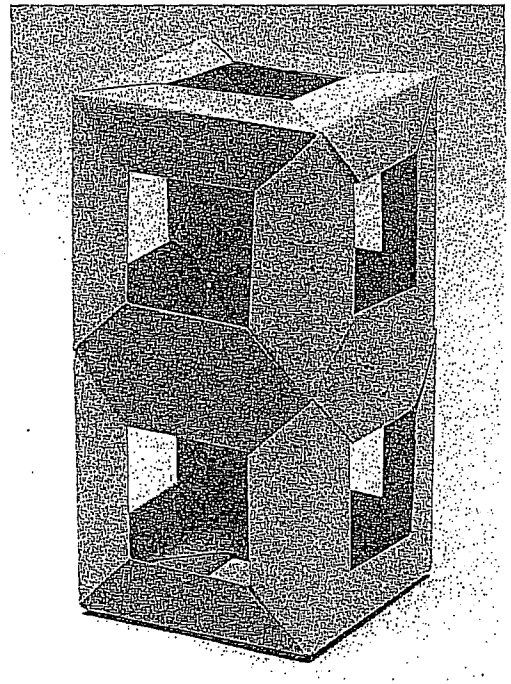
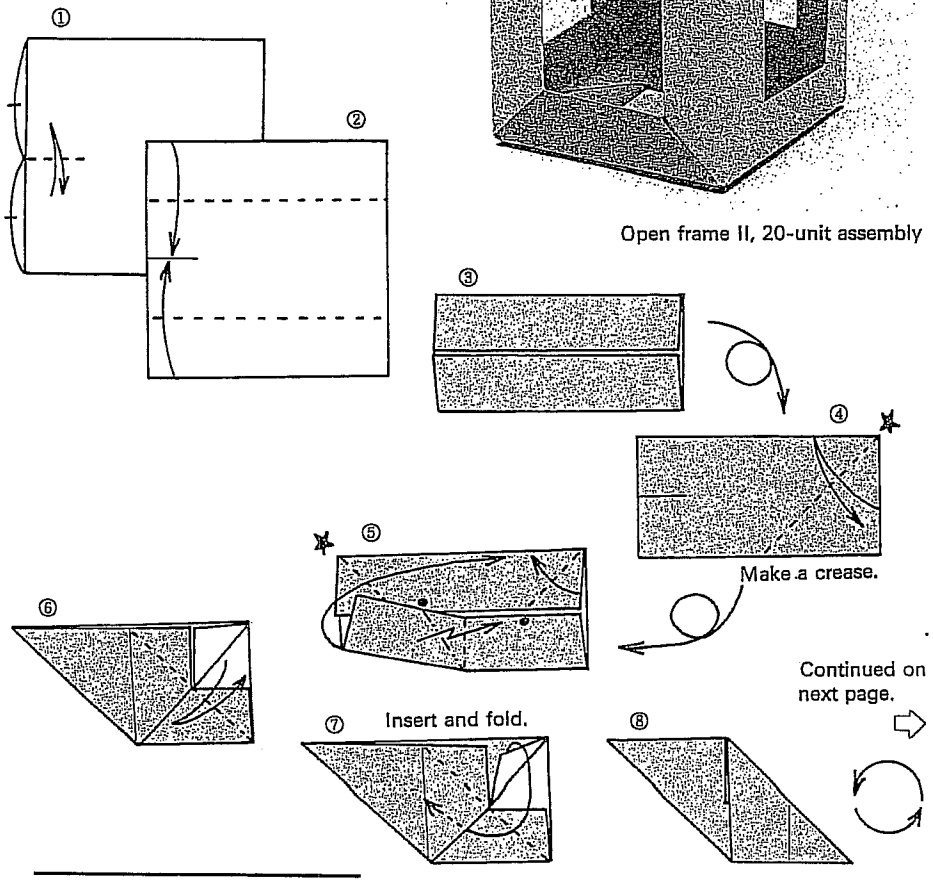
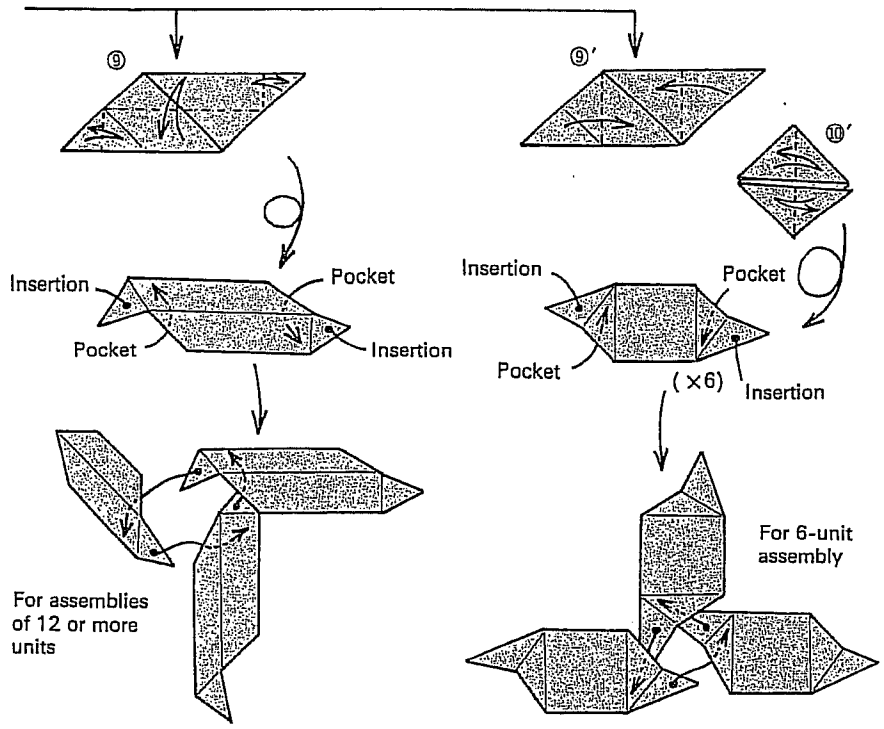
Open Frame II
—Plain

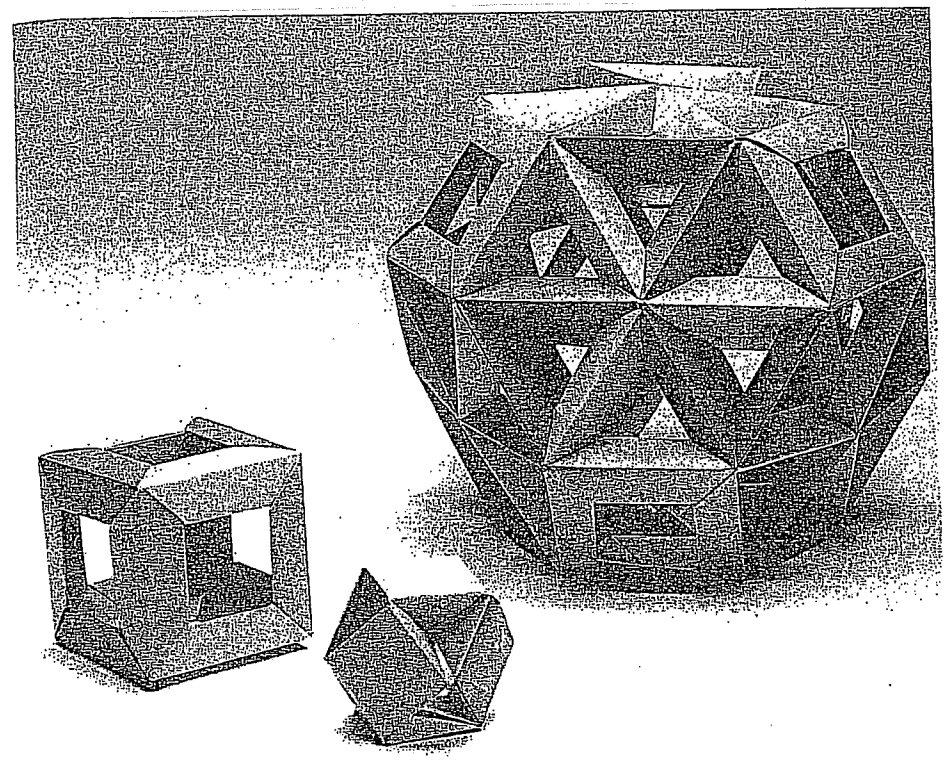
Although it is not as colorful as open frame I with the bow-tie motif, this revised unit manifests no bulging of individual sides. Consequently it is more versatile and can be assembled in a surprising number of ways.



Open frame II, 20-unit assembly





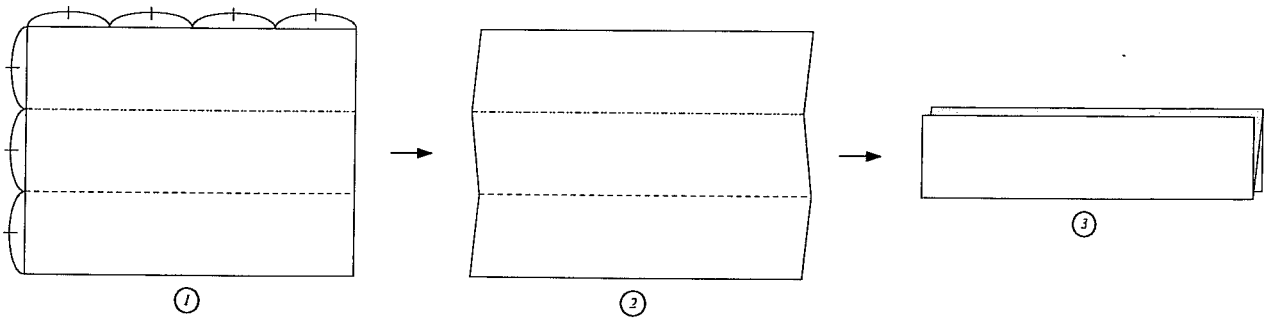


Assemblies of 12 (left), 6 (middle), and 84 (right) units

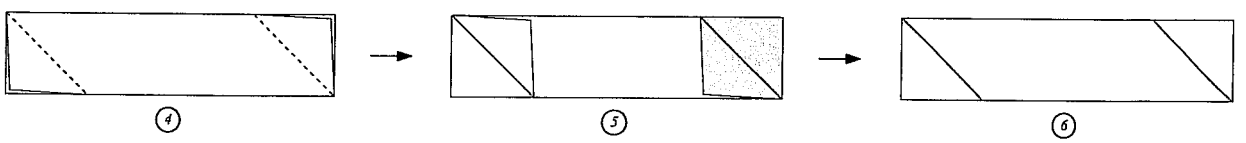
By Tomoko Fusè

Pentagon Module (108 Degrees)

Start with a 4x3 rectangle, and collapse like an accordian:

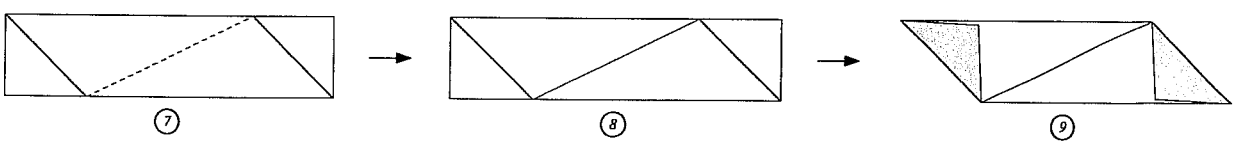


Fold opposite corners in -- use only the top layer -- and unfold

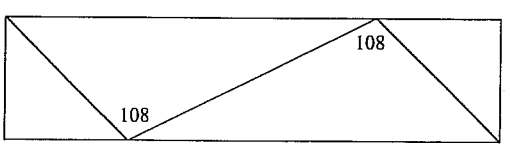


Fold along the dotted line and unfold

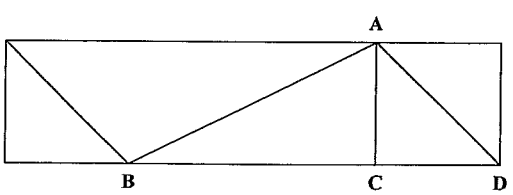
Re-fold the corners, this time folding all layers



The final piece:



Why?



BC = 2
AC = CD = 1
BAC = atan(BC/AC) = 63.44
CAD = 45
BAD = 63.44+45 = 108.44

Penultimate Polyhedra

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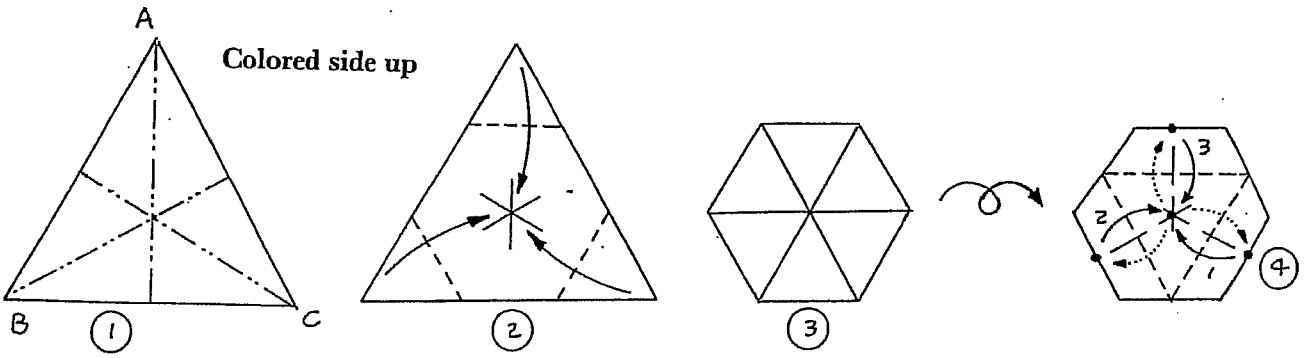
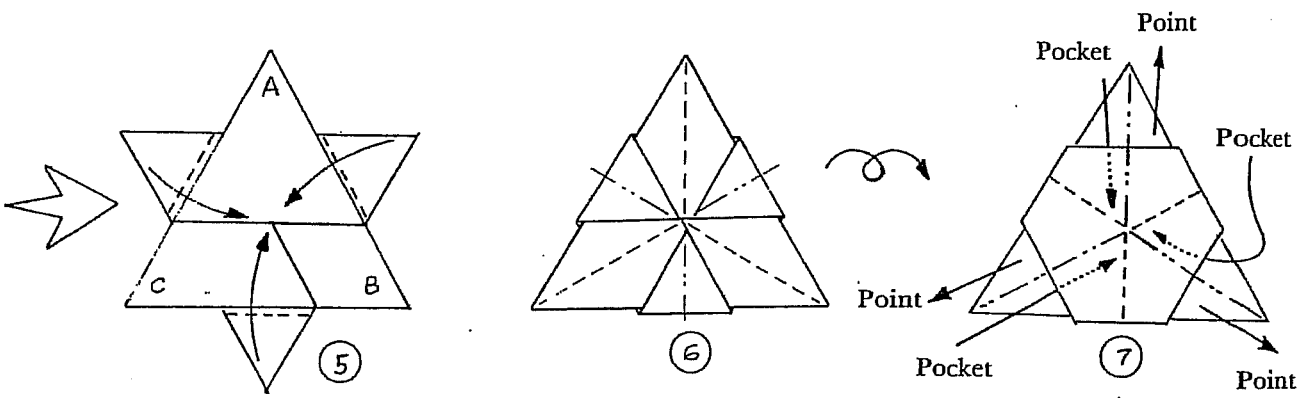
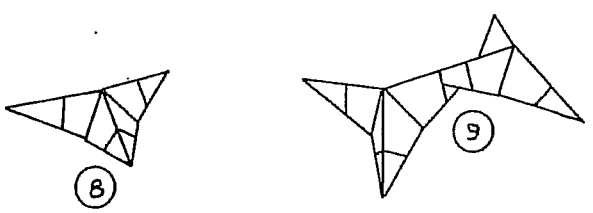
One-Piece Module System

One-Piece Triangle Module by Bennett Arnstein



(See page 16)





x12 = TRUNCATED TETRAHEDRON
x20 = DODECAHEDRON
x24 = TRUNCATED OCTAHEDRON
x48 = TRUNCATED HEXADECAHEDRON
x60 = TRUNCATED ICOSAHEDRON