Consider the various schematic diagrams.

The cubes in the photo were assembled using joint B.
EQUILATERAL TRIANGULAR FLAT UNITS

The unit has pockets on three sides, and it is assembled by inserting joints into them.

1. Fold so as to join the two circles O, using \( \triangle \) as the pivot.
2. Unfold.

3. Fold so as to join the two circles \( O \) at node \( O \).
4. Fold the edge away from yourself and then unfold the upper layer.

5. Tuck inside.
6. (Back)
7. (Front)
8. Each side has a pocket.
Joint B

REGULAR TETRAHEDRON
level ★

Equilateral Triangular Flat Unit
Joint B

[Assembly Method]

Insert the joint into the uppermost pocket.
REGULAR OCTAHEDRON AND ICOSAHEDRON

Equilateral Triangular Flat Unit (p.10)

Regular Octahedron

Regular Icosahedron

Joint B (p.11)

Material com direitos autorais
You can make a regular hexagon by joining 6 equilateral triangular flat units. It is possible to combine this hexagon with equilateral triangular units.

[Assembly Method]

Equilateral Triangular Flat Unit (p.10)

Joint B (p.11)

\( \triangle \times 4 \)

\( \bigcirc \times 4 \)
COMBINATIONS OF SQUARES AND EQUILATERAL TRIANGLES

Squares and equilateral triangles folded from the same size of paper have sides of the same length, and it is possible to connect them. By adding even more components, you can make large, splendid polyhedrons.

ELEMENTS AND FLAT UNITS OF EQUILATERAL TRIANGLE /p. 18
REGULAR OCTAHEDRON

VARIANT CUBE /p. 17

CUBOCTAHEDRON /p. 16
RHOMBIC CUBOCTAHEDRON /p. 16
A STRUCTURE MADE OF 20 CUBOCTAHEDRONS / p.21
Combinations of Squares and Equilateral Triangles

CUBOCTAHEDRON AND RHOMBIC CUBOCTAHEDRON

Square and equilateral triangular flat units folded from the same size of paper have sides of the same length, and it is possible to join them to make various solids.

[Assembly Method]

Square flat joint (p.8)

Equilateral triangular flat joint (p.10)

Joint (p.10)

Assemble like this.

CUBOCTAHEDRON

Joint: X24

\[ \triangle \times 8 \quad \square \times 6 \]

RHOMBIC CUBOCTAHEDRON

Joint: X48

\[ \triangle \times 8 \quad \square \times 18 \]
Combinations of Squares and Equilateral Triangles

VARIANT CUBE level ★★★

Δ×32 □×6

Square flat joint (p.8)

(×6)

Equilateral triangular flat joint (p.10)

(×32)

Joint B (p.11)

(×60)

7.5cm × 7.5cm
EQUILATERAL TRIANGULAR ELEMENTS AND FLAT UNITS

EQUILATERAL TRIANGULAR ELEMENTS

1. Make a short crease on the lower side.
2. Fold on the crease. Join the spots marked by the two circles.
3. Fold on the crease. Join the spots marked by the two circles.
4. Fold on the crease. Join the spots marked by the two circles.
5. Fold on the crease. Join the spots marked by the two circles.
6. Fold on the crease. Join the spots marked by the two circles.
7. Fold on the crease. Join the spots marked by the two circles.
8. Fold on the crease. Join the spots marked by the two circles.

[Assembly Method]

9. Fold on the crease. Join the spots marked by the two circles.
10. Fold on the crease. Join the spots marked by the two circles.

Comment: Tip: 20 and 40.

EQUILATERAL TRIANGULAR ELEMENTS

1. Make a short crease on the lower side.
2. Fold on the crease. Join the spots marked by the two circles.
3. Fold on the crease. Join the spots marked by the two circles.
4. Fold on the crease. Join the spots marked by the two circles.
5. Fold on the crease. Join the spots marked by the two circles.
6. Fold on the crease. Join the spots marked by the two circles.
7. Fold on the crease. Join the spots marked by the two circles.
8. Fold on the crease. Join the spots marked by the two circles.
9. Fold on the crease. Join the spots marked by the two circles.
10. Fold on the crease. Join the spots marked by the two circles.

[Assembly Method]

9. Fold on the crease. Join the spots marked by the two circles.
10. Fold on the crease. Join the spots marked by the two circles.

Comment: Tip: 20 and 40.
A quadruple equilateral triangle is made by combining 1 equilateral triangular element and 3 equilateral triangular flat units.

**Regular tetrahedron** (X4)

**Regular octahedron** (X8)

**Regular icosahedron** (X20)

Use 7.5 cm x 7.5 cm paper. Treat this as 1 triangle.

**[Assembly Method]**

**Joint B (p.11)**

Regular tetrahedron  (X4, X12)
Regular octahedron   (X8, X24)
Regular icosahedron (X20, X60)
STRUCTURES MADE OF 20 CUBOCTAHEDRONS

Square flat unit (p.8)

5 inside square flat units (orange) 5\times12=60
2 outside square flat units (blue) 2\times30=60

Equilateral triangular element B (p.18)

Inside triangles (yellowish green) 20
Outside star-shaped triangles (yellow) 5\times12=60
Exterior triangles (purple) 20

Joint B (p.11)

6 inside square flat units 6\times12=72
2 outside square flat units 30

Level ★★★ 8cm \cdot 8cm
A VARIETY OF REGULAR DODECAHEDRONS

Surface patterns depend on the number of dodecahedrons used. It is possible to assemble them with 60 or 120 rhomboid units.

VARIANT KUSUDAMA DODECAHEDRON / p. 30

RHOMBIC CUBOCTAHEDRON, DODECAHEDRON AND: MADE WITH 120 RHOMBOID UNITS / p. 29

KUSUDAMA DODECAHEDRON / p. 30
REGULAR ICOSAHEDRON:
MADE WITH 30 RHOMBOID UNITS /p.26

ICOSAHEDRON, DODECAHEDRON:
MADE WITH 60 RHOMBOID UNITS /p.28

12 REGULAR
DODECAHEDRONS /p.24
Regular Dodecahedron  MADE WITH 12 UNITS  level ★★★

1. Make short creases on the upper and lower sides.
2. Fold along the line marked by the two circles to make a crease.
3. Make a short crease on the right side.
4. Fold so as to join the two circles.
5. Fold in numerical order.
6. Fold as to join the two circles.
7. Fold the upper corners down.
8. Fold the other side in the same way.

Material com direitos autorais
Fold by inserting the part marked with a star into the pocket.

Assemble 12 units like this.

Connect by joining the spots marked with stars.
Make a rectangular pattern paper.

Methods 1-3 were worked out by Kazuo Haga.

Put sheets of paper on top.

Use a cutter to cut additional sheets according to the pattern.

Make creases and unfold.

→
Icosahedron/dodecahedron STRUCTURE OF 60 RHOMBOID UNITS

Attach the triangles on the sides with creases marked with a star.

Assembly: 60 rhomboid units

△×20 ○×12
Rhombic icoso-dodecahedron STRUCTURE WITH 120 RHOMBOID UNITS

(A) has 1 crease and (B) has 2 creases. Assemble each of 60 units on the sides with the creases marked ★.

△×20  □×30  ◊×12
KUSUDAMA DODECAHEDRON  level ★★  15cm·15cm

Cut a square into three equal parts and make a rectangle with sides in a 1:3 ratio.

1. Make a short crease on the upper side.
2. Fold so as to join the circles.
3. Fold so as to join the circles.

[Use your own judgment about where to fold the paper]

You may fold the paper into three layers, estimating the appropriate fold location.

5. Unfold the back.
6. Fold only the upper layer.
7. Unfold the back.
8. Fold only the upper layer.
9. Fold only the upper layer.
10. Unfold the back.
11. Fold only the upper layer.
12. Unfold the back.
13. Fold only the upper layer.
14. ...
Fold at the white corner square to align with edge (it doesn't have to be exact)

Assembly Method:

Starting with step 15, fold in the same way as in step 16.
4

REGULAR HEXAGONAL FLAT UNITS

There are two kinds of hexagonal flat units: one has 3 pockets on its 6 sides and the other has 6 pockets. Join the units with other elements, and create larger, more complex figures.

TRUNCATED TETRAHEDRON / p. 36

USING REGULAR HEXAGONAL FLAT UNITS WITH 3 POCKETS (1) / p. 38

TRUNCATED OCTAHEDRON / p. 36
4 \textbf{REGULAR HEXAGONAL FLAT UNITS}

There are two kinds of hexagonal flat units: one has 3 pockets on its 6 sides and the other has 6 pockets. Join the units with other elements, and create larger, more complex figures.

\textbf{TRUNCATED TETRAHEDRON} /p.36

\textbf{TRUNCATED OCTAHEDRON} /p.36

\textbf{USING REGULAR HEXAGONAL FLAT UNITS WITH 3 POCKETS (1)} /p.33
1. Make a short crease on the lower side.
2. Fold up as shown using the corner as the pivot.
3. Fold as shown using the two creases.
4. Make a crease and unfold.

5. Leave a bit of a space between the flaps and the corner.
6. Make a crease and unfold.

7. Fold in numerical order.
8. Leave a bit of a space here.
9. Fold in numerical order.
10. Make a crease and unfold.
11. Fold in numerical order.
12. Make a crease and unfold.
13. Fold in numerical order.
14. Leave a bit of a space here.
15. Unfold.

16. Insert flap marked with the star into the slit and fold the left side.

17. Inside reverse fold.

18. Be sure that the part marked with the triangle is securely tucked in.

19. Pull out the flap.

20. Insert the flap into slit (8) of step 20.


22. Pocket.

23. Simple Form

15'. Pull out the flap.

16'. Glue the inside of the shaded part so that it stays in place.

Joint C

1. Fold in half on the crease.

2. (Assembly Method)
TRUNCATED TETRAHEDRON AND OCTAHEDRON

The finished work appears to have "windows."

Fold so that triangular windows appear.

Assume that on top layer, windows appear.

Hexagonal flat units: \( \times 4 \)

Semi-C: \( \times 6 \)

Hexagonal flat unit: \( \times 8 \)

Triangular: \( \times 12 \)
TRUNCATED ICOSAHEDRON level ★

10cm × 10cm

Hexagonal flat unit (p. 34)

Joint C (p. 35)

Assemble so that pentagonal windows appear.
Fold the corner marked with the black dot up to the other black dot, using the corner marked with a triangle as the pivot.

[Assembly Method]

Treat this unit as an equilateral triangle when you assemble the figure.

Material com direitos autorais
11 Insert in between the two layers

Assemble the rest of it in the same way.
Regular Hexagonal Flat Unit USING 3 POCKETS (2) level ★

Triangle Element B

1. Make a short crease on the lower side.
2. Place the paper on the crease.
3. Fold the paper along the crease.
4. Repeat steps 2 and 3 on the opposite side.
5. Fold the paper along the crease.
6. Repeat steps 2 and 3 on the opposite side.
7. Fold the paper along the crease.
8. Repeat steps 2 and 3 on the opposite side.
9. Fold the paper along the crease.

[Assembly Method] Hexagonal flat unit (p. 34)

You may also use Triangle Element B in the assembly.

Material com direitos autorais
Now you will learn to make structures with two units stacked on top of each other. Using this unit, you can make the solids shown on pp. 38-41 without windows. You can also use it on p. 36.

Hexagonal Flat Unit (Simple Form) (Starting from step 16 on p. 35)

1. Pull out the flap
2. Insert
3. Stack the units
4. You may cut out triangles from a long sheet of paper of the proper measurements, as shown.

Triangle Element C

1. Make a truncated tetrahedron (see p. 36) and insert the elements into the triangle windows.
Square Element

1. Fold the paper in half diagonally.
2. Unfold and make another fold in the opposite direction.
3. Make a crease and unfold.
4. Make a truncated octahedron (see p. 36) and insert the elements into the square windows.
EDGE CUBES

These cubes are assembled by connecting them at twelve places. There are square or star-shaped windows in the middle of each surface. Modifying the folds and measurements changes the cubes and the size of the windows.
This cube is assembled by joining the sides. Changing the folds and the measurements changes the size of the windows.

1. Make creases as shown.
2. Align the edges and fold.
3. Fold the edge under the flap.
4. Unfold the upper layer.
5. Make creases and unfold.
6. (Assembly Method)

Connect 12 units like this.
A cube assembled by connecting sides. Changing the folds and the measurements changes the size of the windows.

1. Align edges and fold.
2. Make creases as shown.
3. Fold under the flap.
4. Fold under the flap.
5. Unfold the upper layer.
6. Make creases and unfold.
7. Make creases and unfold.
8. Assemble in the same way as the medium cube (p. 45).
Assemble in the same way as the medium cube (p. 46)
A cube with star-shaped windows. Changing the folds and the measurements changes the size of the windows.
Tuck the tab marked with a star ⭐ inside the folds.
Fold the corner inward
Unfold

(×12)

[Assembly Method]
Tuck the tab marked with a star inside the folds.

Make creases and unfold.

Assemble in the same way as the large cube (p. 49).
Starting from step 3 on p. 48.

1. Fold to the place indicated by the circle.
2. Fold on line (a).
3. Fold so as to join the two circles.
4. Fold on line between the triangle and the circle.
5. Unfold.

6. Fold to the place indicated by the circle.
7. Fold on line (a).
8. Fold on line between the triangle and the circle.

10. Tuck the tab marked with a star inside the folds.
11. Make creases and unfold.
12. Assemble in the same way as the large cube (p. 49).
The bottom of each pyramidal unit forms a different shape, as shown below. You can use them to assemble various kinds of solids. Let's look at a regular tetrahedron, for example. The regular tetrahedron consists of 4 equilateral triangles. So you need to make a 3-unit structure, and put it together so that it has 4 triangular pyramids.

The next example is a cube consisting of 6 squares. So make a 4-unit structure, and put it together so that it has 6 square pyramids.

When combining different shapes, begin with the smallest structure, although there may be cases in which you follow a different order. If you need to make a cuboctahedron, begin with a 3-unit structure. Make it the core, and enlarge it by connecting the units one by one.
6-UNIT STRUCTURE Regular Tetrahedron, 12-UNIT STRUCTURE Octahedron

Double-sided convex hexagonal ring (p. 54)

Begin with a 3-unit structure.

Triangular pyramids adjoin one another

Double-sided convex hexagonal ring (p. 54)

Four triangular pyramids join at the place marked by the star.
Double-sided convex hexagonal ring (p. 54)

Make 5 triangular pyramids centered around the place marked with a star ★

Begin with a 3-unit structure.

Five triangular pyramids join at the place marked with a star ★
36-Unit Structure Truncated Octahedron level ★★
48-UNIT STRUCTURE  Rhombic Cuboctahedron  level ★★

Double-sided convex hexagonal ring (p. 54)

Begin with a 4-unit structure.

Triangular and square pyramids adjoin square pyramids

△×8  □×18
90-UNIT STRUCTURE Truncated Icosahedron level ★★

Double-sided convex hexagonal ring (p. 54)

Begin with a 5-unit structure

Hexagonal pyramids adjoin pentagonal pyramids.
120-UNIT STRUCTURE  
Rhombic Icosahedron/Dodecahedron

Double-sided convex hexagonal ring (p. 54)

Begin with a 3-unit structure.

The sides that adjoin the pentagon are square.
The sides that adjoin the triangle are square.
DOUBLE-SIDED CONCAVE HEXAGONAL RING SOLID

The structure is the same as that of the double-sided convex hexagonal ring solid. However, you use a different folding method when assembling it in order to hide the extra lines. The finished works are sturdy, so glue is not necessary. Unit B, which is used in some structures, has a crease only on one side.

HINT ON ASSEMBLY

Take special note of the small triangle shaded in step 10. This triangle hooks firmly and makes the unit sturdy.
As is seen in the figures, the units are indented along the ridges. You can assemble various kinds of solids by making use of them.

Example: A truncated octahedron

It consists of squares and hexagons.

First, make 4 unit structures and put them together so that the hexagons are connected around the square indentation.

Begin with the smallest structure to 4 unit structure in this case. Make it the core and expand it by connecting additional units one by one.

Assembled 3-unit and 6-unit structures in the same fashion.

- Equilateral Triangle (Triangular indentation)
- Square (Square indentation)
- Regular Pentagon (Pentagonal indentation)
- Regular Hexagon (Hexagonal indentation)
30-UNIT STRUCTURE  Regular Dodecahedron  level ★★

Double-sided paper are hexagons and pentagons.

Begin with a 5-unit structure.

The adjoining sides are pentagons.

12cm × 6cm
36-UNIT STRUCTURE  Truncated Octahedron  level ★★

12cm • 6cm

Diagram showing how to assemble the truncated octahedron with 36 units.
72-UNIT STRUCTURE Rhombic Truncated Octahedron  level ★★

Double size concave hexagonal ring (p. 68)

Begin with a 4-unit structure

The sides adjoining the square are hexagons and octagons.

4

4

4

4

4

12cm × 6cm
60-UNIT STRUCTURE icosahedron/Dodecahedron

Double-sided concave hexagonal ring (p.68)

The sides adjoining the pentagon are triangles.

△×20  □×12
90-UNIT STRUCTURE Truncated Icosahedron  level ★★

Double-sided concave hexagonal ring (p.68)

Begin with a 5-unit structure

The sides adjoining the hexagons are hexagons and pentagons

The sides of each pentagon are hexagons

The icosahedron has 12 pentagons and 20 hexagons
The sides adjoining the pentagon are squares.
The sides adjoining the triangle are squares.

Begin with a 5-unit structure.

Double-sided concave hexagonal ring (p.68)
It is possible to fold double-sided convex and concave units from A4 (210 x 297 mm) or B5 (182 x 257 mm) paper. In that case, you end up with larger windows. If you fold using square paper, the windows end up being too large and make the unit fragile.

The assembly method is the same as that of the double-sided convex honeycomb ring (p. 56 – p. 65)

For the convex type:

For the concave type:

The assembly method is the same as that of double-sided concave solids (p. 69 – p. 76)
Various Methods of Assembling Double-sided Convex Hexagonal Ring

36-UNIT STRUCTURE level ★★

You can assemble the double-sided hexagonal ring in shapes other than a ball. See how many kinds of structures you can assemble using convex units.
Various Methods of Assembly - Double-sided Convex Hexagonal Rings

44-UNIT STRUCTURE  level ★★

Double-sided convex hexagonal ring (p. 54)

[Framework Shape]

The framework shape viewed lengthwise (Intermediate stage)
Various Methods of Assembling
Double-sided Convex Hexagonal Ring

Double-sided concave hexagonal ring (p.68)

24-unit structure, 28-unit structure

Level ★★

12cm × 6cm

(Σ x12)

(Σ x14)

B is made of 2 units

24-unit structure

28-unit structure

(Framework Shape)
69-UNIT STRUCTURE level ★★

12cm - 6cm

Diagram and instructions on page 54.
48-UNIT STRUCTURE

Double-sided convex hexagonal ring (p.54)

Double-sided concave hexagonal ring (p.68)

Connect the 3-unit assemblies at the triangle of truncated hexahedrons.
If you use convex units for jointing, you can connect solids made of concave units. Devise your own variations and try to construct different shapes. You can figure out how to make forms other than spherical shapes.

Double-sided convex hexagonal ring (p.54)

Oursided concave hexagonal ring (p.68)

Connect the double-sided convex hexagonal rings to the square.
Double-sided convex hexagonal ring (p. 54)  
Double-sided concave hexagonal ring (p. 68)

Six-unit structure of double-sided convex hexagonal rings.  
The bottom is square.

Connect 6-unit assemblies of double-sided convex hexagonal rings at the square.
DIAGONALLY FOLDED TRIANGULAR-UNIT SOLIDS

This unit is made from rectangular paper, which is made from square paper cut in half, with a basic crease made diagonally. The finished solids are sturdy. Shown here are models with polyhedrons at their core.

6-UNIT STRUCTURE / p. 94

30-UNIT STRUCTURE / p. 95

24-UNIT STRUCTURE / p. 96
**DIAGONALLY FOLDED TRIANGULAR UNIT**

Level: ★★  
12cm • 6cm

The hooks on the unit make the solid as sturdy as the double-sided hexagonal ring. It is easier to fold than you might think.

1. ✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧✧MUX


12 13 14 15

N \P

Safty —
HINT ON ASSEMBLY 1

Insert the shaded part down into the slot of the other one. The tip works on a hook and raises the structure layers.

HINT ON ASSEMBLY 2

The bottom of each element is a triangle or a square, and each pyramid is a square. The element units are assembled in a variety of ways. The double square forms a hexagonal ring. Still need a window on the left frame, which means the window. The assembly method is the same as that of the double square hexagonal ring, but the slope of the top triangle is such that you cannot assemble the model into a solid pyramid.
6-UNIT STRUCTURE  
Regular Tetrahedron Star, 12-UNIT STRUCTURE  
Regular Octahedron Star

Level: ★ ★  
12cm - 6cm

Triangle Unit (p = 10)
Begin with a
Tetrahedron

Regular Tetrahedron Star
Filled triangular pyramids are of the star

Regular Octahedron Star
Four triangular pyramids are of the star

Triangle Unit (p = 5)
Begin with a
Octahedron

By folding the 6- and 12-unit structures, you can create these star formations.
30-UNIT STRUCTURE  Regular Icosahedron Star  level ★★

Begin with a 3-unit structure

Five triangular pyramids join at the star

Regular Icosahedron Star

Five triangular pyramids gather at the star.
24-UNIT STRUCTURE Cuboctahedron Star  level ★★

Triangular Unit (p. 82)

Begin with a 4-unit structure

Cuboctahedron Star

△ x 8 □ x 6

12cm • 6cm
48-UNIT STRUCTURE  Rhombic Cuboctahedron Star  level ★★

Trangular Unit (p. 92)

(X48)

△×8  □×18
60-UNIT STRUCTURE

Variant Cube Star

level ★★★

Copyrighted Material

12cm - 6cm

60-UNIT STRUCTURE

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level ★★★

12cm - 6cm
POLYHEDRONS

Regular tetrahedron
\[ \Delta \times 4 \]
6 sides
4 apices

Regular octahedron
\[ \square \times 8 \]
12 sides
8 apices

Regular dodecahedron
\[ \Delta \times 20 \]
30 sides
12 apices

Truncated tetrahedron
\[ \Delta \times 4 \]
18 sides
12 apices

Truncated octahedron
\[ \square \times 6 \]
36 sides
24 apices

Truncated dodecahedron
\[ \Delta \times 12 \]
90 sides
60 apices

Truncated icosahedron
\[ \Delta \times 30 \]
150 sides
120 apices

Cuboctahedron
\[ \Delta \times 8 \]
36 sides
24 apices

Icosidodecahedron
\[ \Delta \times 20 \]
180 sides
120 apices

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SQUARE AND EQUILATERAL TRIANGULAR FLAT UNITS

Each side has a pocket into which a joint is inserted to make three-dimensional figures.
**SQUARE FLAT UNITS**

(level ★)

15cm × 15cm

Assemble by inserting joints into four pockets.

1. **Assemble Method**
   - Unfold one of the units.
   - Tuck both sides into the pockets.

2. **Joints**
   - Use Method A for joints, but when the paper is thick or difficult to assemble, use B.