

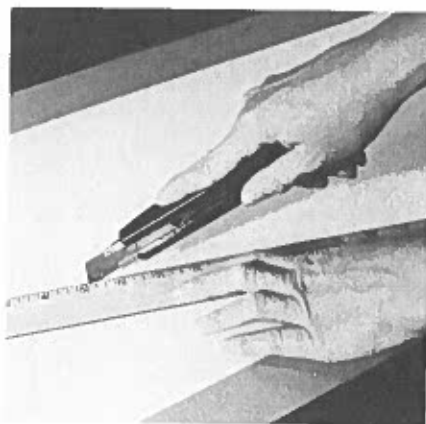
# Techniques and Explorations

## Cutting

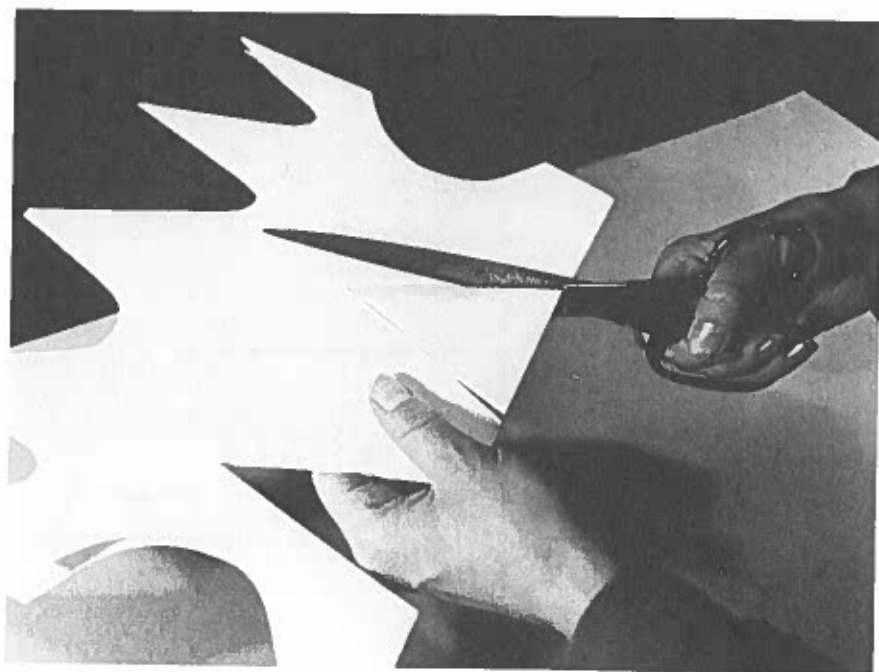
**With Scissors** Good quality scissors are essential for making clean cuts. In order to produce effective cut-paper shapes, short, choppy strokes should be avoided. Smooth, continuous cuts are easily obtained by holding the scissors steady in one hand while feeding the paper; the scissor blades should be opened, then slowly closed as the paper is fed. Manicure scissors are useful for making small or more delicate cuts. Pinking shears are useful for decorative zig-zag cuts.

**With the Knife** A sharp mat knife and a metal straightedge are essential tools for making straight cuts. The table should be protected with a sheet of pulp board, which is used as a work surface. An X-acto knife may be employed for cutting curved and more complicated shapes. Always use more than one stroke to cut through heavy-weight papers. The guillotine cutter is useful for cutting a large number of strips or shapes.

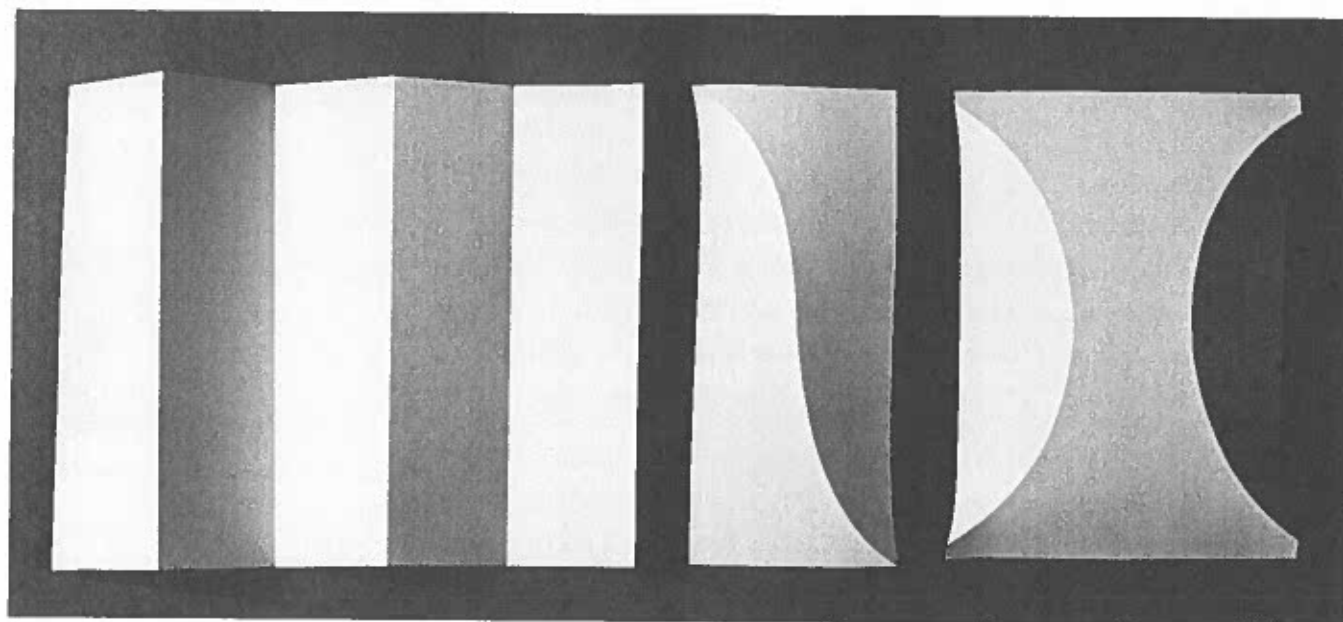
*Safety Note:* Keep fingers well back on the straightedge while using a knife.



The mat knife and ruler are used to make straight cuts.



Clean-cut edges are produced by moving the paper into the scissors while cutting.



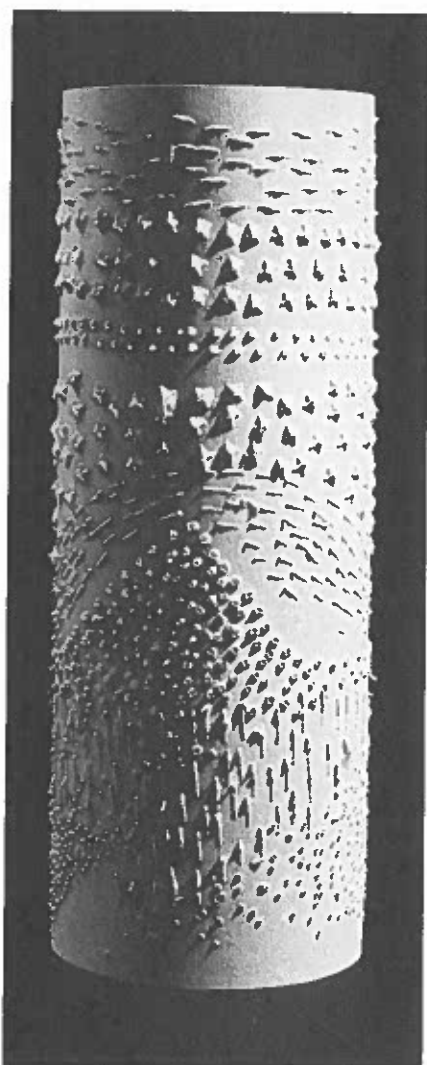
Paper takes on a spatial quality when it is folded or bent along creased or scored lines.

## Creasing, Scoring, Folding

Creasing is done by drawing a blunt tool such as a letter opener over the paper surface, leaving an indentation in preparation for making a cleanly folded edge. Aside from a letter opener, other good creasers include a dull kitchen knife, a bone folder, a wooden modeling tool and a key. Note that creasing produces a raised line on the other side of the paper. When the paper is folded, the line should be on the inside of the fold. Scoring is similar to creasing, except that instead of a blunt tool, a sharp knife is used to partially cut the paper surface. Thicker papers and cardboard are scored rather than creased. The techniques of creasing or scoring in conjunction with folding impart structural strength to paper and allow it to become a self-supporting material.

## Curling

Curling is a way of transforming paper into curved shapes and forms. Narrow strips can be curled by simply pressing them down with the flat side of a knife and pulling them over the edge of the blade. Larger sheets can be drawn over the edge of a table or under a ruler, which makes them pop into curved forms. Paper can also be curled by being rolled with the grain over dowels, knitting needles or other cylindrical forms.



Pierced paper rolled to form a cylinder. A nail, knife and Phillips screwdriver were the only tools used to produce the textured surface.

## Tearing

Tearing produces a ragged edge, in sharp contrast to the clean edge made by cutting. No tools other than hands are required for achieving this distinctive deckle edge. Torn shapes can be further enhanced by curling, creasing, bending, joining, decorating, etc.

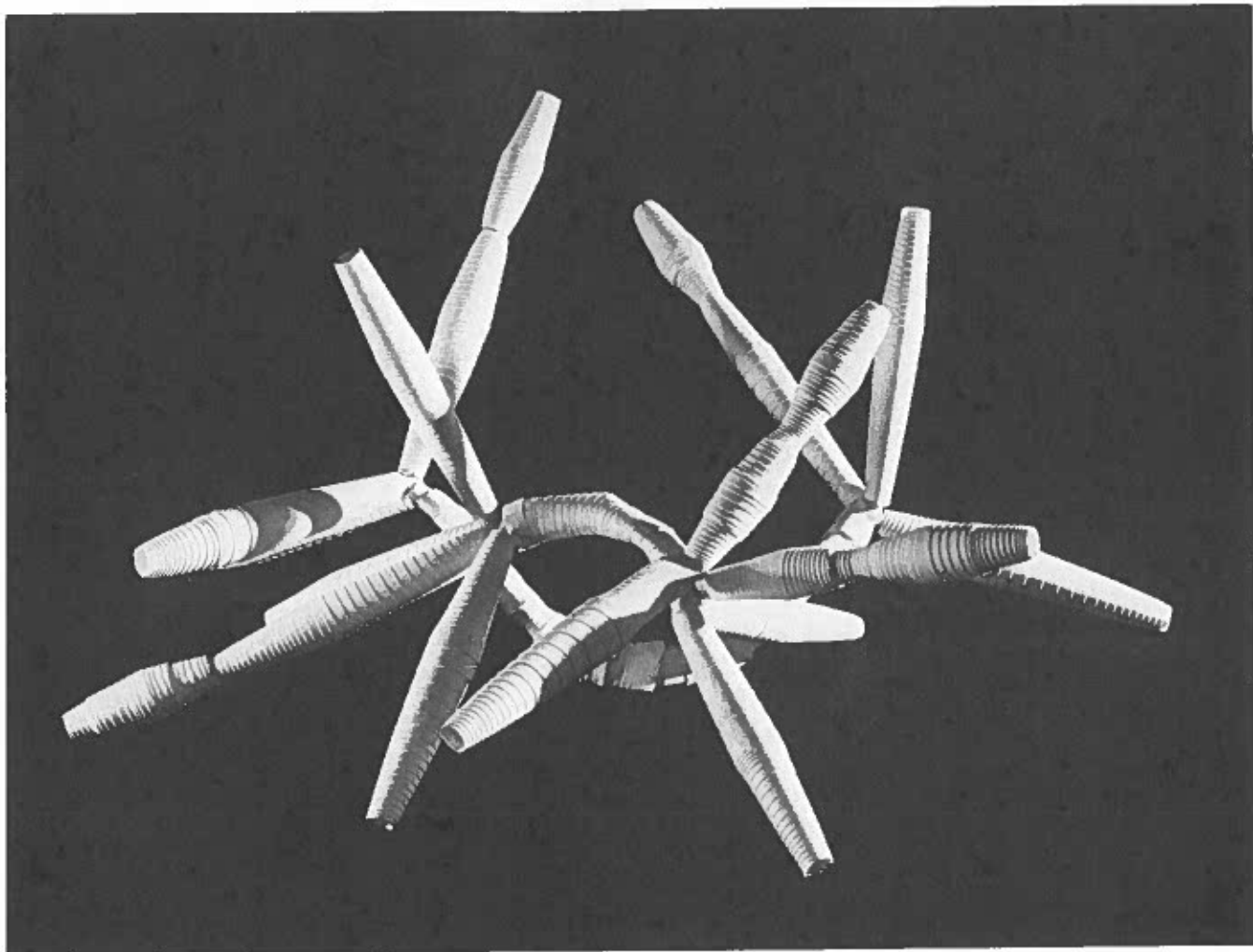
## Piercing

Piercing—poking holes through paper—is a delightful way of creating textures and designs. You can achieve a variety of surface effects by repeatedly puncturing paper with commonplace tools such as sharpened sticks, nails, hole punches, screwdrivers or sewing or knitting needles. Paper should be pierced over a soft surface such as a carpet remnant. The braille-like texture is revealed on the paper's reverse side.

*Safety Note:* Use care with sharp instruments. Always point sharp tools away from your body and keep hands well away from direct piercing action.

## Weaving

There are many ways to weave sculptural forms out of paper. One is by interlacing paper strips, weaving them into a paper matrix. Another is by interlacing paper strips into objects that have slotted or gridded shapes, such as perforated boxes, baskets, window blinds or other found objects. Conventional floor looms can also be employed using a linen warp, or length-wise threads, and paper strips as weft, or cross-wise fibers.



Modular beads made by winding triangular papers tightly over dowels or other cylindrical objects. Beads can be attached to form a wearable necklace or, as here, to create a freestanding sculpture.

## Winding

Distinctive sculptural forms can be created by winding strips of paper around skeletal structures made of wood, metal, wire, rope or other linear material. The wound paper adds volume to the underlying structure and can be further enhanced by painting. To make paper beads, roll elongated, triangular paper strips tightly over a wood dowel or knitting needle. Glue the strips' ends, then slide them off the dowel or needle used to shape them. Spiral forms are produced by rolling papers cut into 45-degree triangles tightly over a tubular mold. When released from the mold, they hold the spiral shape.

## Wrinkling/Crumpling

Paper that has been folded, crushed or wrinkled and then unfolded and laid flat again—either by deliberate or serendipitous means—will yield interesting surface patterns and textures. The effects can provide dramatic contrast to the pristine quality of untextured areas in terms of surface and tonal variations.



Tissue and other types of flexible papers were folded and/or crumpled, then pressed flat and glued to a background to create this textured surface.

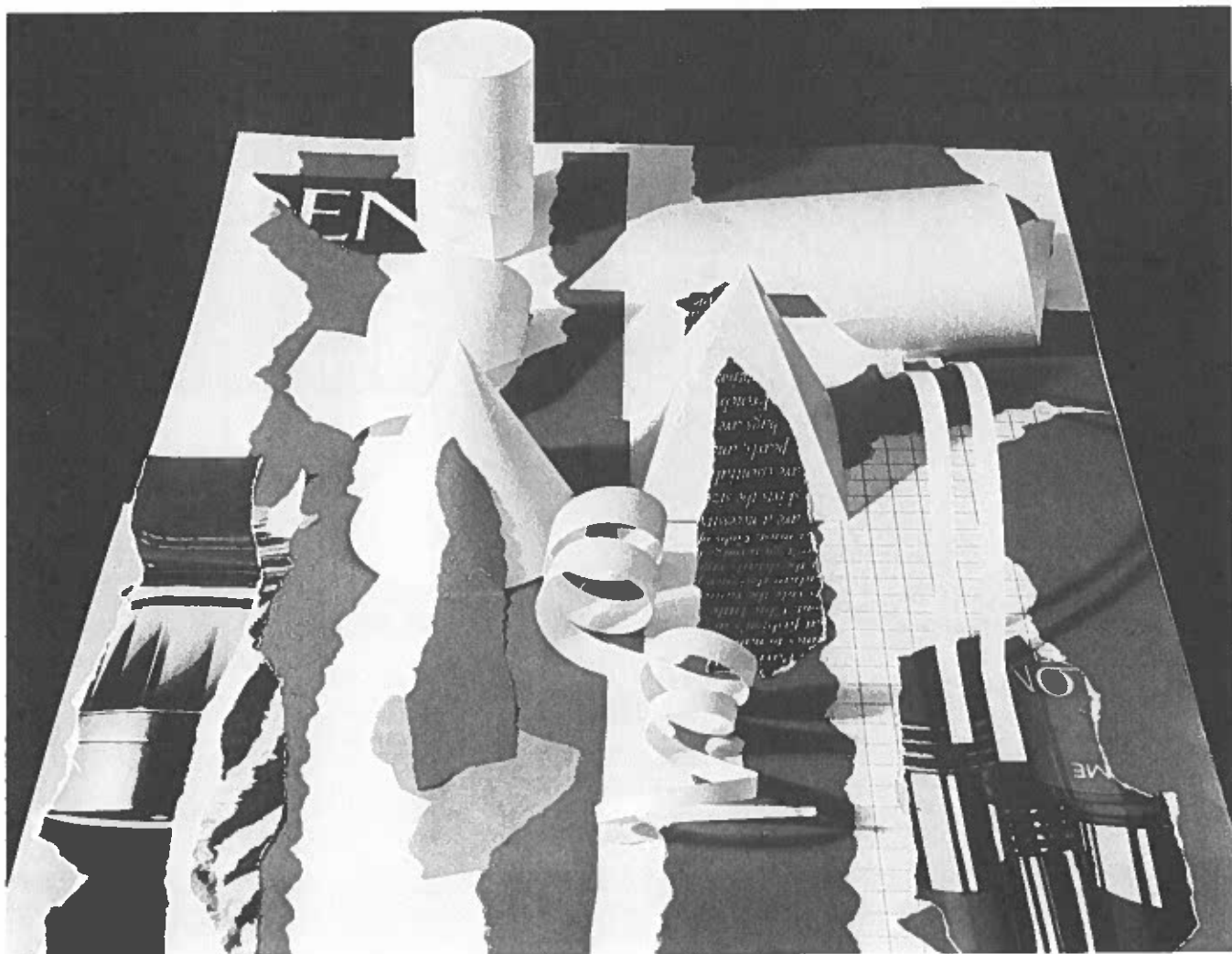
## Layering

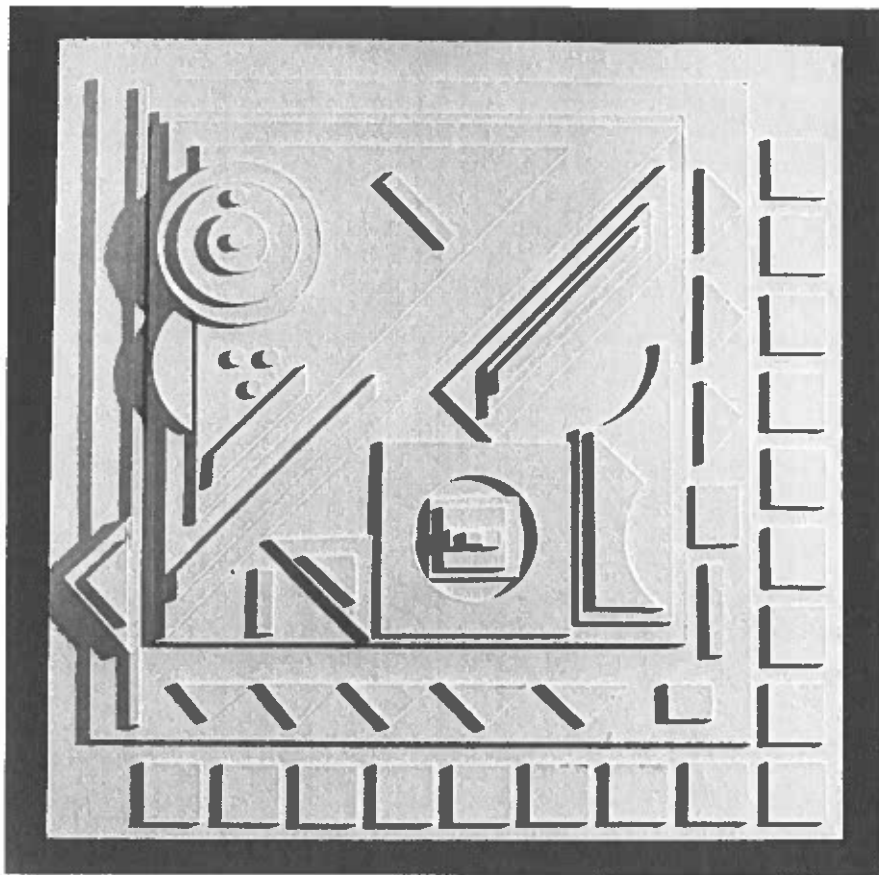
In this process, cardboard or paper shapes are overlaid on a ground plane. Depending on the thickness of the materials and number of layers used, the overlaid shapes can yield a surface that is either flat, as in a collage, or three-dimensional, as in a bas-relief or a three-dimensional topographical map.

## Joining

Both flat and three-dimensional shapes of paper may be adhered to a background panel with white glue or other quick-set adhesives. Found objects for use in mixed media techniques may require the use of silicone adhesive or five-minute epoxy.

**By Gluing** Glues should be selected according to the type of paper used and the task at hand. Do not use library paste, cellulose glue or rubber cement; these materials quickly lose their adhesive properties. White glue is an excellent choice, but use it sparingly; too much will produce unsightly marks and cause lightweight paper to pucker or warp. If necessary, use paper clips to hold parts



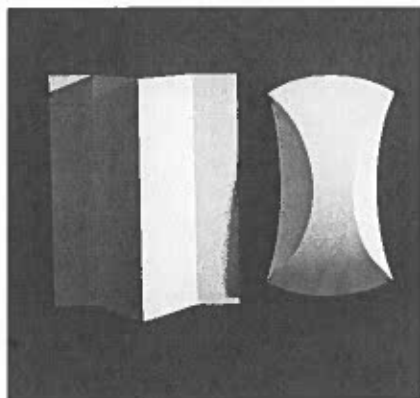


Bas-relief created by overlaying cardboard shapes.

together while glue sets. Glue sticks are easy to use but do not give lasting results. A thick adhesive such as silicone seal or five-minute epoxy is a good choice for attaching three-dimensional paper forms and found objects to each other or to flat materials.

*Safety Note:* Heed manufacturer's warnings and safety precautions while using glues.

**By Notching** Notching provides an easy way to join shapes of medium- or heavy-weight paper. Short slots are made on each of the shapes to be joined so they can slip together perpendicularly. To join two shapes using this technique, make two parallel cuts on each shape with a mat or utility knife. To make a slot, cut away the paper between the two cuts. Make sure the width of the slot on each shape is exactly the same as the thickness of the adjoining paper. The notched shapes can then be interlocked to form larger structures and configurations. Note that the length of each slot will determine how deeply the shapes will interlock. A related way of joining paper without gluing is by employing a system of slits and tabs (see page 77 for more details on creating tabs).



Rectilinear and curvilinear planes are produced by creasing and folding paper in straight or curved lines.

## Basic Planes and Three-Dimensional Forms

When a piece of paper is creased by a straight line and then folded, two rectilinear planes are produced. When paper is creased with a curved line, curvilinear planes are produced. Sculpture is composed of rectilinear planes, curvilinear planes, combined rectilinear/curvilinear planes, cones, cylinders, polyhedra, pyramids, prisms and cubes.

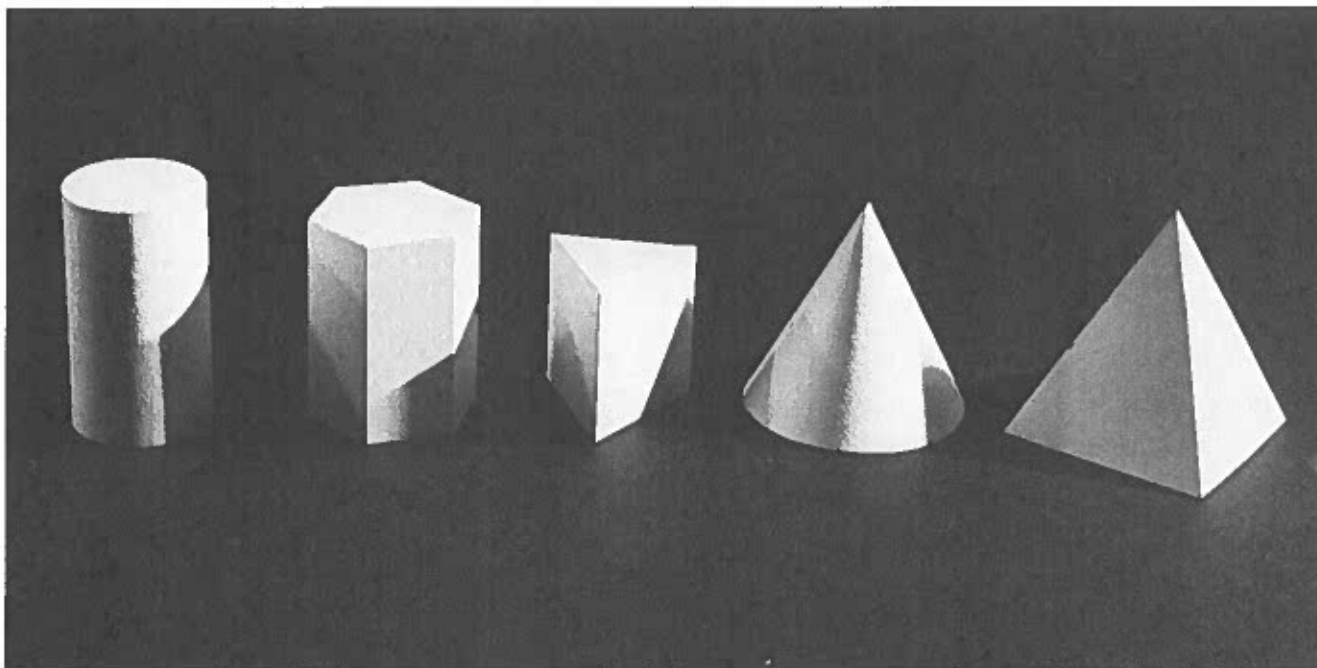
Standard cylinders are composed of two identical circles that are parallel to each other and attached by a perpendicular tube.

Prisms have identical ends and parallel sides. A basic prism has square ends, while other prisms can have triangular, polygonal or irregularly shaped ends.

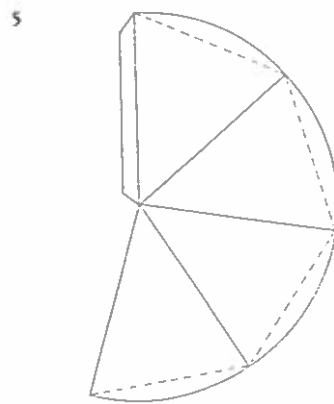
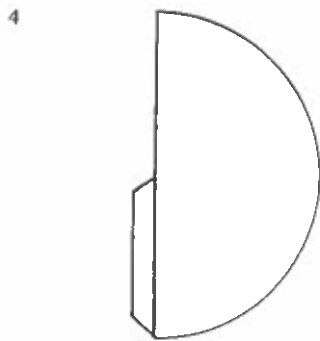
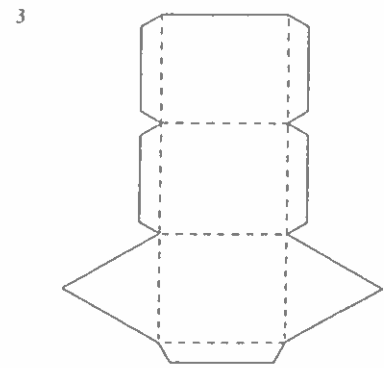
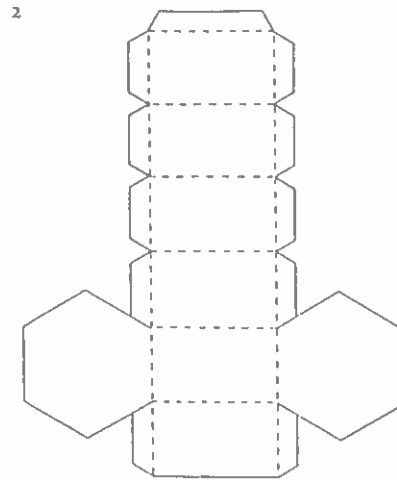
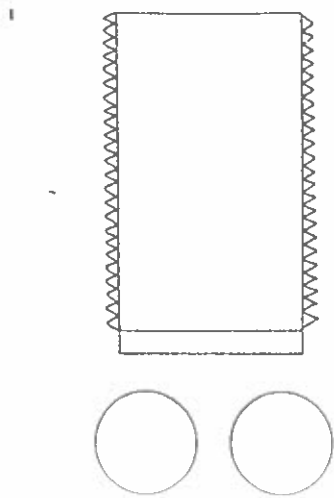
The standard cone has a circular base, a vertex (highest point directly above the center of the base) and a surface made by connecting every point on the outside edge of the base to the vertex.

The standard pyramid has a square base with four triangular walls that meet at the vertex.

Basic forms (from left): cylinder, hexagonal prism, triangular prism, cone and pyramid. Courtesy Bob Stowell.



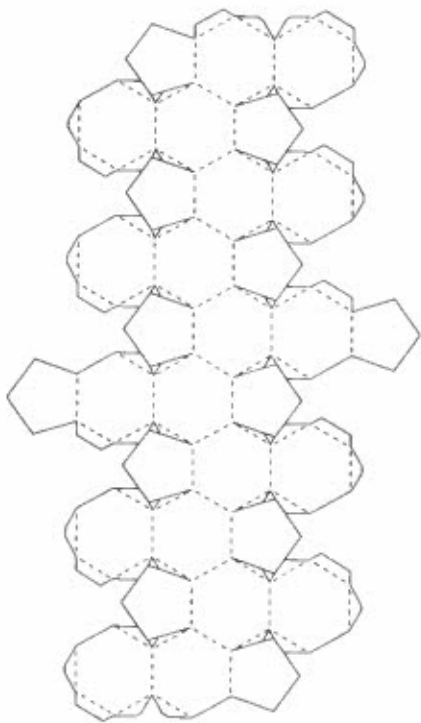




Patterns for constructing basic forms.  
 1) Cylinder, 2) hexagonal prism,  
 3) triangular prism, 4) cone, 5) pyramid.

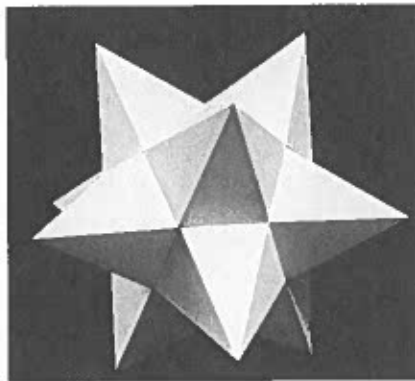


The truncated icosahedron has twenty faces and twenty vertices. Other geometric solids can also be modified by truncation, or slicing off the corners.

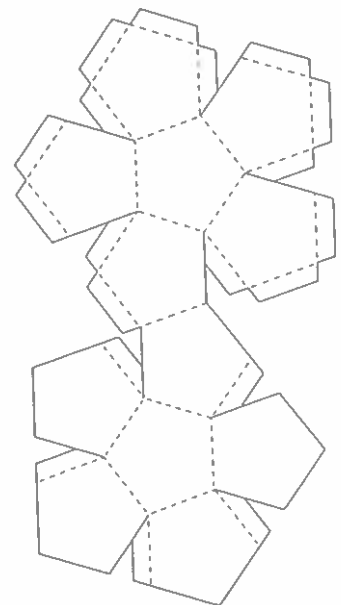


Pattern for constructing the truncated icosahedron.

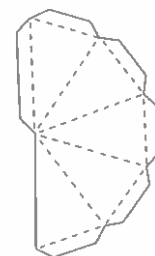
A polygon is a two-dimensional plane surface formed by the end to end connection of straight lines. A polyhedron is a three-dimensional form made up of connected polygons. The planes of the polygons join together to make a closed volumetric form such that each side of every polygon is shared with the side of another. The sides of the polygons intersect at their ends to form vertices, the points where lines meet. Therefore, polygons are the faces of a polyhedron. A polyhedron is categorized as regular if all its faces are identical and equal polygons and all of its vertices are alike.



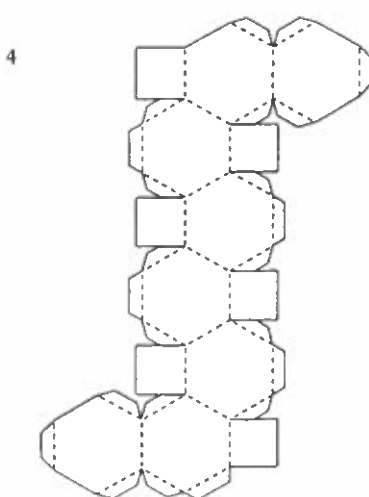
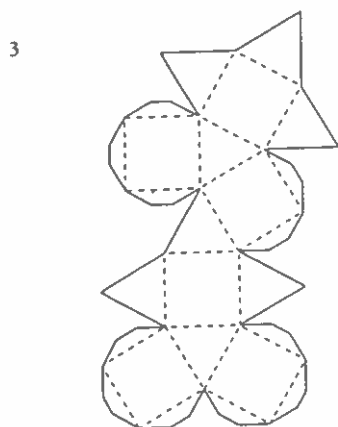
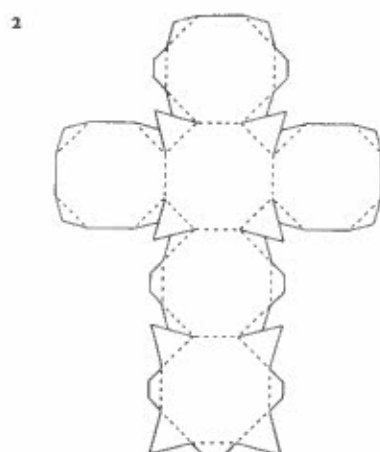
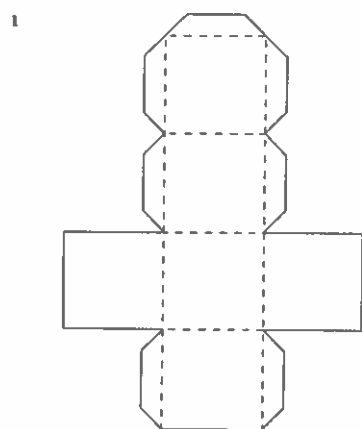
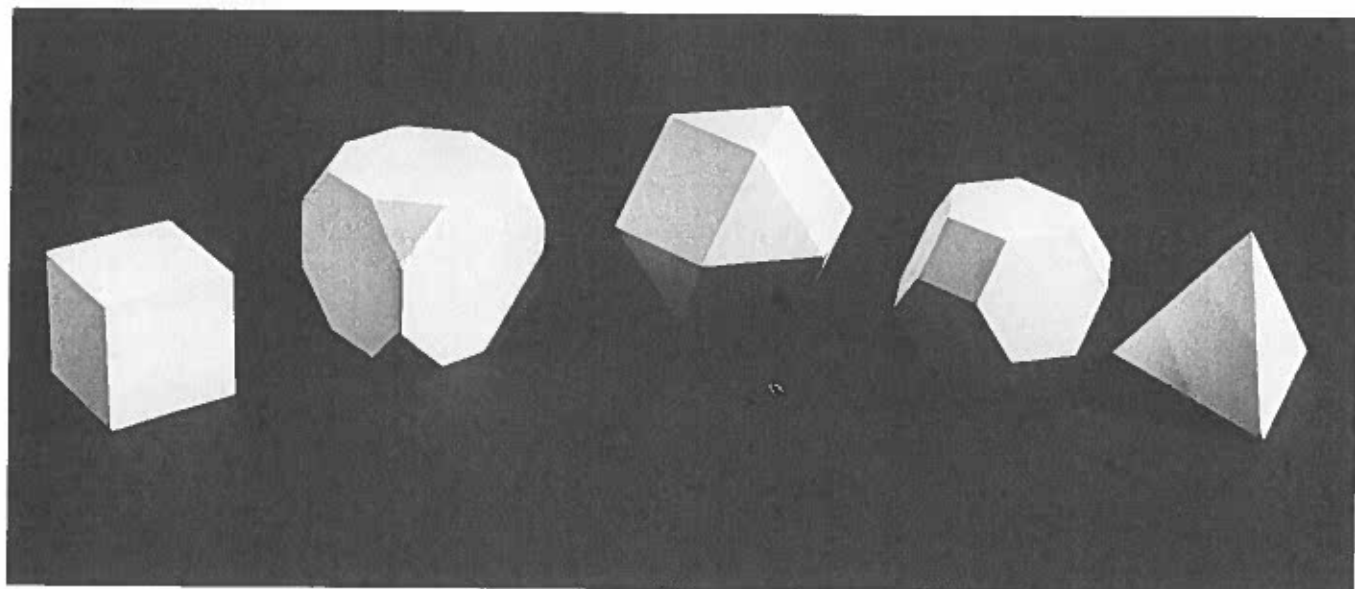
The stellated dodecahedron can be created by attaching a five-sided pyramid to each of the dodecahedron's twelve faces.



Pattern for constructing a dodecahedron.

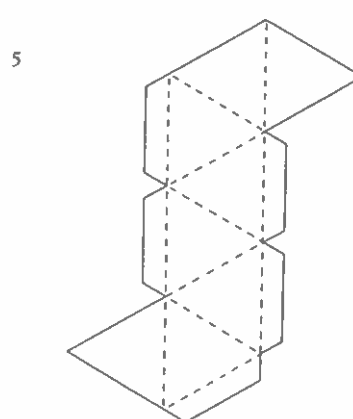


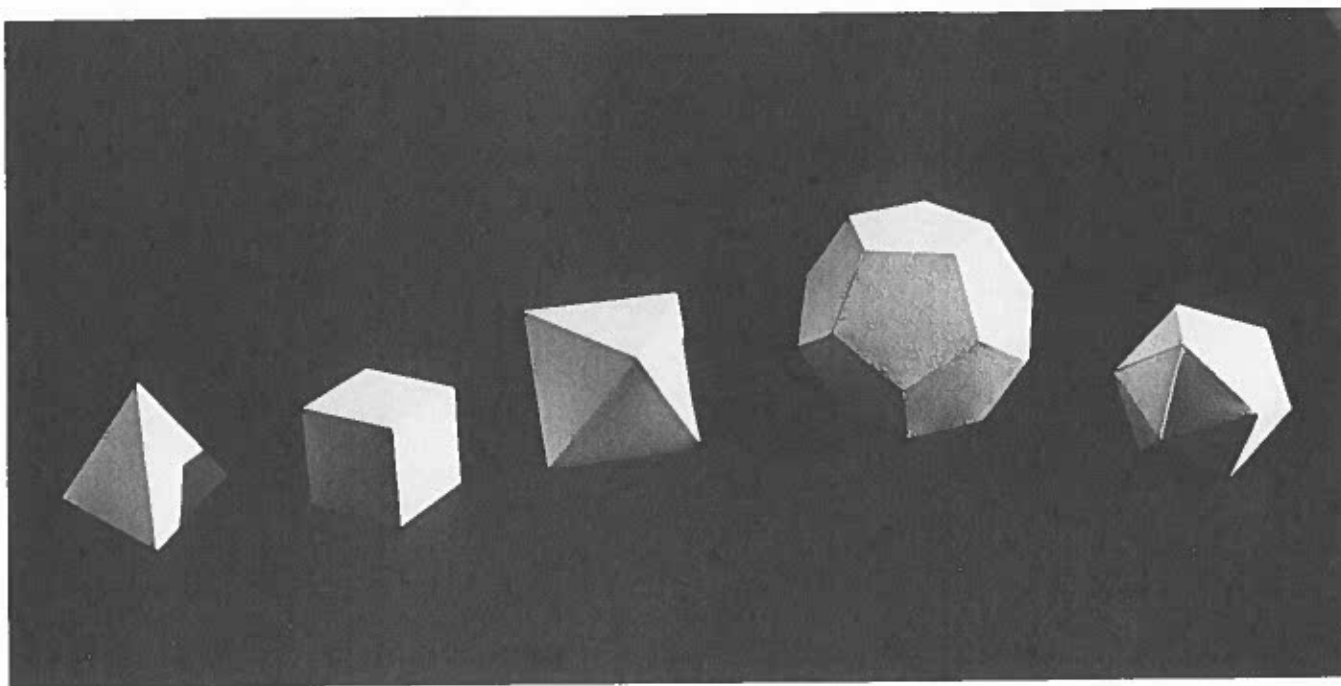
Pattern for constructing a five-sided pyramid.



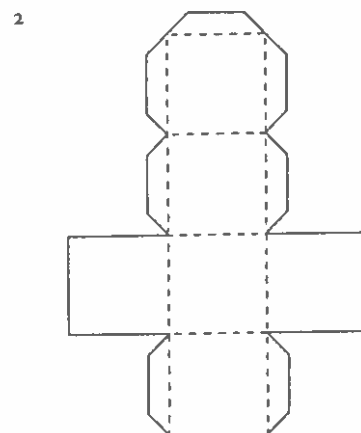
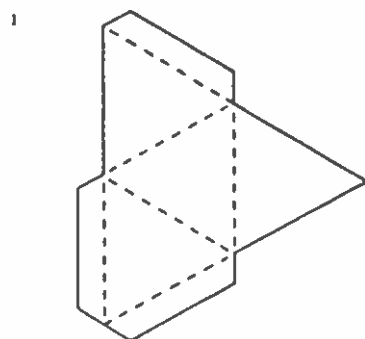
An evolution of forms: The hexahedron (cube, left) progresses to the truncated hexahedron (cube with corners sliced off), to the cuboctahedron (fourteen faces), to the truncated octahedron (fourteen faces, twenty-four vertices or outstanding points, thirty-six edges), to the octahedron (eight faces).

Patterns for constructing 1) hexahedron, 2) truncated hexahedron, 3) cuboctahedron, 4) truncated octahedron, 5) octahedron.





The five Platonic solids (from left): tetrahedron, hexahedron (or cube), octahedron, dodecahedron and icosahedron. Each form possesses planar facets of exactly the same shape.



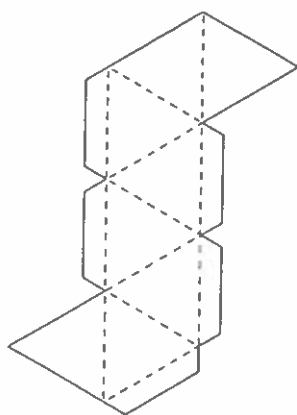
Patterns for constructing the Platonic solids: 1) tetrahedron, 2) hexahedron, 3) octahedron, 4) dodecahedron, 5) icosahedron. Cut on the solid lines. Crease and fold on dotted lines; apply glue to tabs prior to assembly.

Plato was apparently the first person to develop a classification of basic geometric shapes. The five Platonic solids—the tetrahedron, octahedron, hexahedron, icosahedron and dodecahedron—are regular polyhedra which are bounded by identical polygonal faces in which all vertices are equivalent.

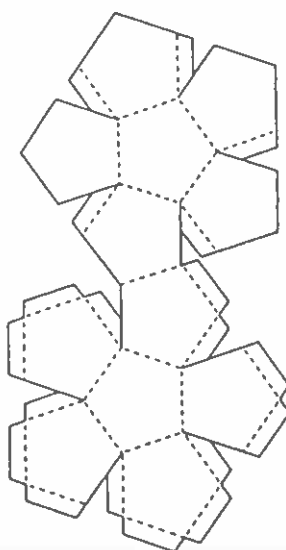
## Using Patterns to Construct Three-Dimensional Forms

An easy way to create geometric forms with the patterns in this book is to enlarge them on a photocopier to the desired size. The patterns can be transferred onto medium-weight paper (such as Mayfair) by tracing with carbon paper or a graphite sheet. The solid lines on the patterns indicate the outside edges of the shapes, and are guidelines for cutting out the shapes. The dotted lines indicate edges of polygons, and should be used as guidelines for creasing and folding. The patterns also include tabs for gluing and holding the forms together.

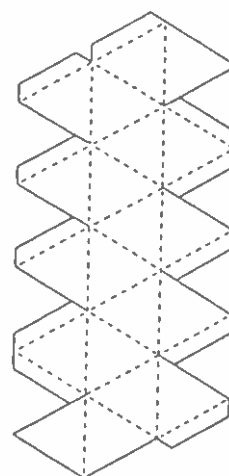
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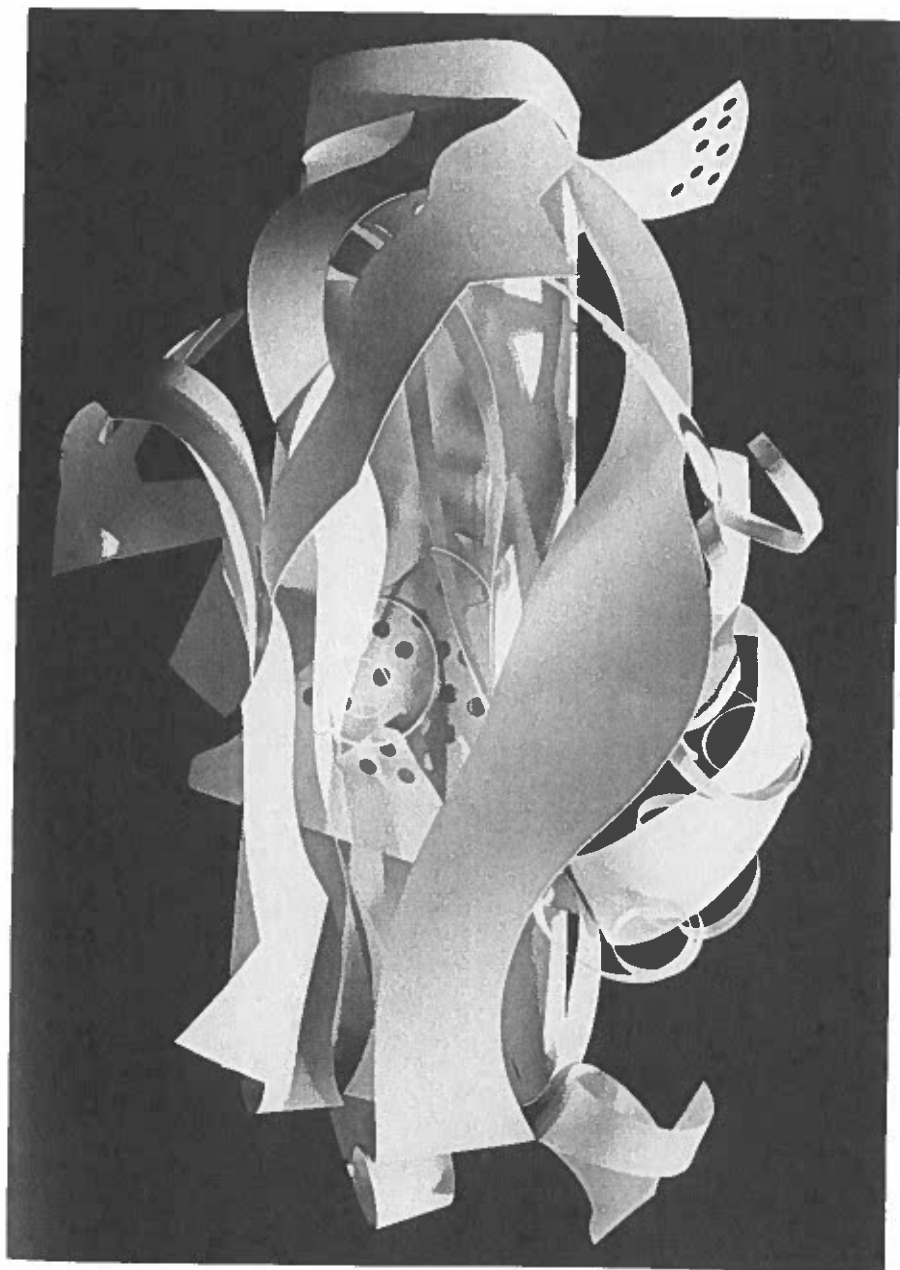


5



## Sculpture-in-the-Round

If a picture is worth a thousand words, is a sculpture worth ten thousand pictures? Sculpture-in-the-round is an entity not only in three-dimensional space but in time as well. This means that a three-dimensional construction cannot be totally appreciated from a single viewpoint, but requires the spectator to move around it, gathering other perceptions. Creating sculpture-in-the-round, therefore, is analogous to producing hundreds of drawings in a single artwork; the



Ben Krasner, *Sculpture-in-the-Round*, 1990. Paper, 24 x 12" (61 x 30 cm). Courtesy the artist.

*When looking at sculpture we can walk up to it, back away, walk around it, retrace our steps, change our position for a different viewpoint, move in close or to a distance to perceive it as we wish. Not even a three-dimensional film could provide us with this experience.*

BERNARD MYERS, CONTEMPORARY WRITER



Student work from the Alberta College of Art, *Wolf*, 1980. Paper, 10" high (25 cm).  
Courtesy Ken Samuelson.

third dimension means we must consider the sculpture from every direction—from front, back, top and sides—to produce an organized structure.

#### Experiment 16

### Focusing on Composition

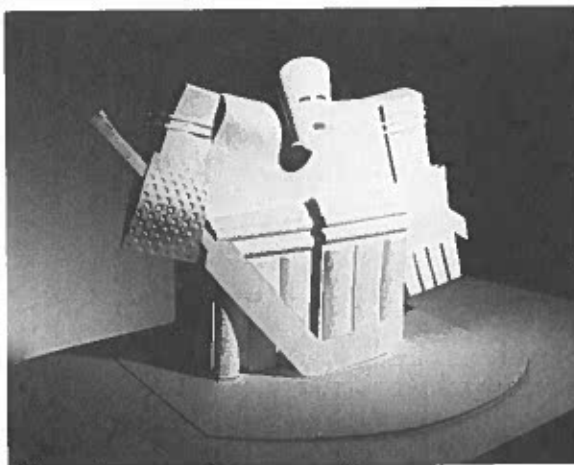
Exploit the characteristics of paper as a sculpture medium by cutting and forming a piece of white, medium-weight paper into a variety of shapes and strips. Use techniques such as creasing, folding, rolling and pleating. Arrange the components to provide visual continuity as you view the structure from different angles. Join the components by notching, stapling, taping or gluing. (Use paper clips to hold glued parts together until the adhesive sets.) Because the sculpture will be composed of planar rather than solid shapes, keep in mind the words of Clement Greenberg, a noted author and art critic who, in describing a contemporary direction in sculpture, proclaimed, "Space is there to be shaped, divided and enclosed, but not to be filled." His words underscore the importance of remembering that negative space is equally important as positive form in sculptural composition.

#### Experiment 17

### Adding a New Dimension: Color

Make a sculpture-in-the-round that involves color. Use commercially available colored papers or white paper you have decorated yourself with acrylic paint or other art media and techniques such as painting, dry-brushing, texturing, spraying or stippling. Cut and shape the paper to form a three-dimensional construction.

Student work from the Alberta College of Art, *Goalie*, 1980. Paper, 12" high (30 cm).  
Courtesy Ken Samuelson.



# Pleating

Paper is easily pleated by alternately scoring lines on its front and back sides and bending it to form an accordion fold. On patterns developed for pleated forms, solid lines indicate lines that should be creased and folded on the front of the paper; dotted lines indicate lines that should be creased and folded on the back of the paper. If you pay careful attention to accurate measuring and folding, a sheet of paper can be transformed into a distinctive three-dimensional pattern.

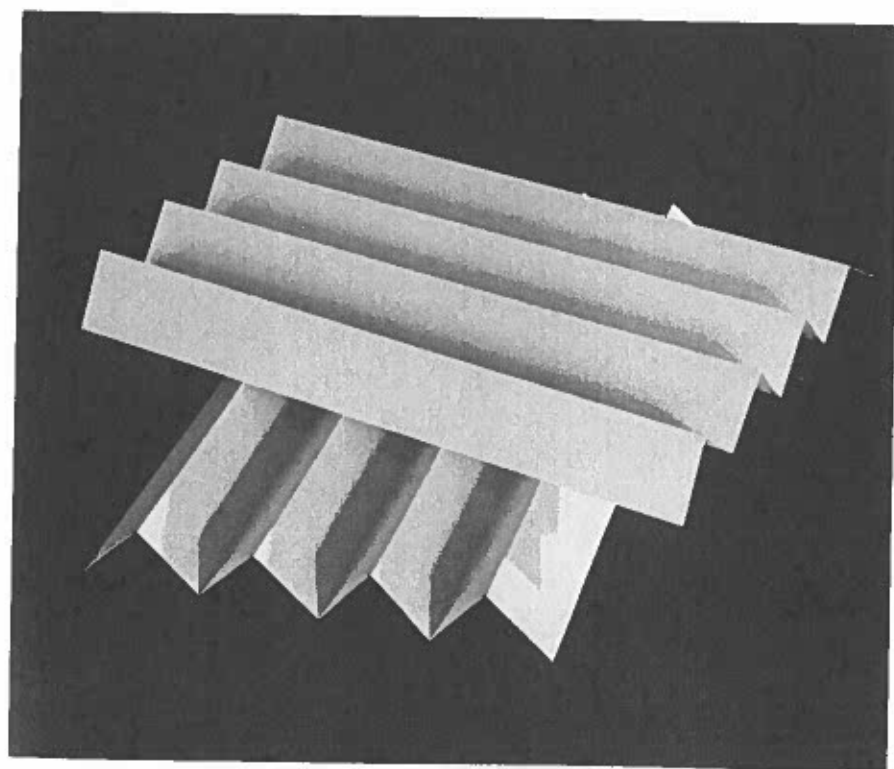
## Experiment 18

### Straight, Parallel Pleats

You will need a medium-weight paper, a ruler, a creasing tool such as a dull knife or letter opener, dividers and a 4H pencil. Determine the grain of the paper and plan the pleats to run parallel to it. Using a ruler and/or dividers, mark off spaces at the top and bottom of the paper, pressing hard enough with the pencil to leave tiny holes on the surface. Draw lines to connect the pinholes on opposing sides of the paper, creating a series of parallel lines. Next, with a straightedge or ruler as a guide, score and crease every other line (shown as continuous lines in the illustrations). Turn the paper over and score and crease the

*Folding a single sheet of paper can give it strength and rhythmical form.*

HIROSHI OGAMI, ARTIST AND AUTHOR



Accordion pleating offers a variety of sculptural effects.



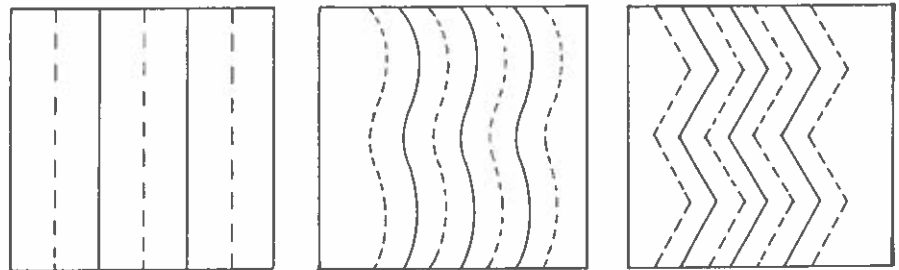
remaining lines on the back (the dotted lines in the illustration). Press firmly to make sharp indentations; it will help produce a clean edge. By alternately scoring both sides of the paper, you will be able to fold the paper into clean, accordion-like pleats. Finally, carefully fold the paper on the indentations, one pleat at a time, first the front, then the back until the accordion pattern is produced. Smooth each edge of the pleat with the creaser as you proceed.

### Experiment 19

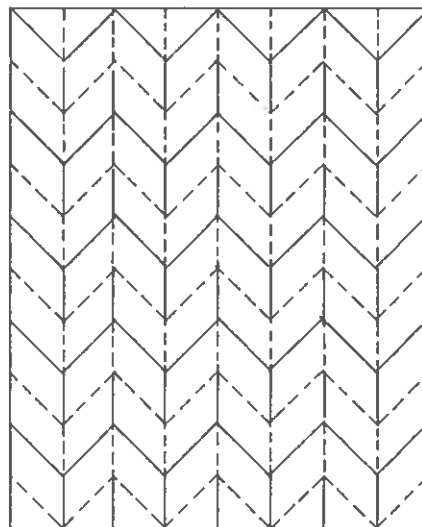
## Curved and Zig-Zag Pleats

Try making pleats with curved and zig-zag patterns. Use a compass to draw even curves, or create a curved cardboard template from which parallel curved lines can be traced. Score as with straight, parallel pleats. Creasing and folding must be done carefully to retain the curved shapes. For zig-zag patterns, follow the above procedure using angled, zig-zag lines instead of curves. In both cases, the diagrams provided will help plan your design.

Patterns for creating straight, curved and zig-zag pleats. Solid lines should be creased and folded on the front of the paper, while dotted lines should be creased and folded on the back.



Pattern for constructing Zig-Zag Bas-Relief. Solid lines indicate lines that should be creased and folded on the front of the paper; dotted lines should be creased and folded on the back of the paper.



Opposite:  
Try making a relief or three-dimensional structure that incorporates a zig-zag pleated pattern. Florence Temko, *Zig-Zag Bas-Relief*, 1989. Paper. Courtesy the artist.

*Constructivism . . . made a complete break with the figurative tradition, placing geometrical shapes and volumes at the foundation of sculpture.*

EDMUND BURKE FELDMAN,  
ART EDUCATOR AND CRITIC

## Open Forms

The Constructivist movement of the 1920s triggered a radical change in sculpture. The use of monolithic, representational form, such as in the work by Michelangelo, gave way to open, geometric structures without figurative representation.

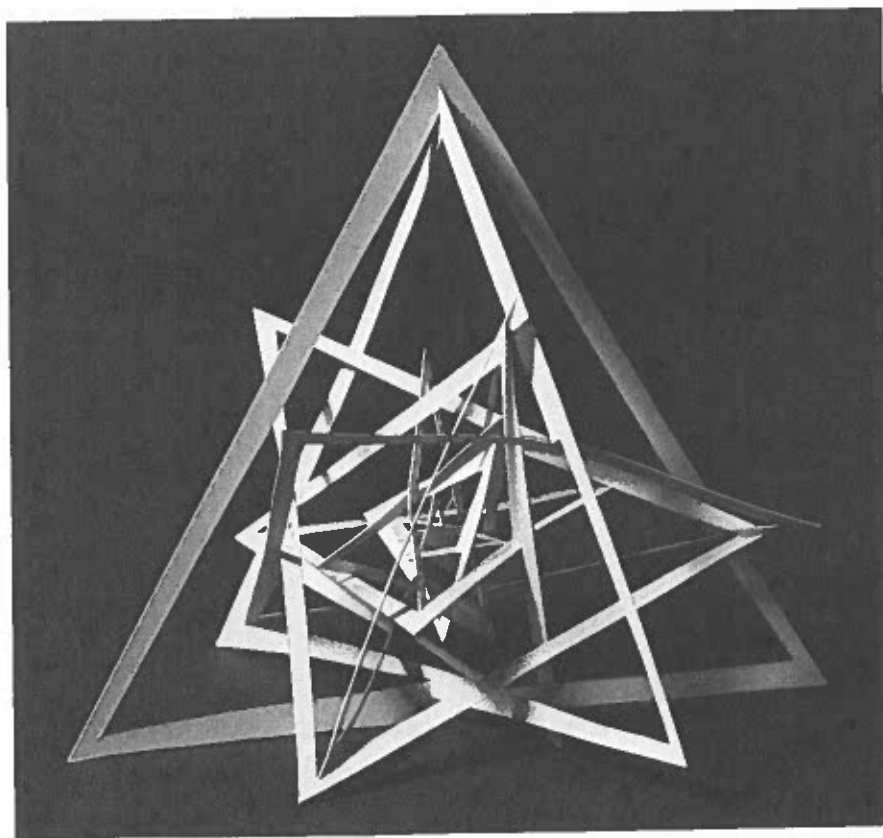
In essence, sculpture is interaction between form and space. In open-form structures, space predominates; it has claimed a major victory in its interplay with form. The structures tend to be skeletal, light and airy. Open form could be called introverted, since sculptural variations lie principally within the work. Conversely, closed-form structures tend to be solid and weighty in appearance; interior space is shut off and variations lie only on the surface of the sculpture.

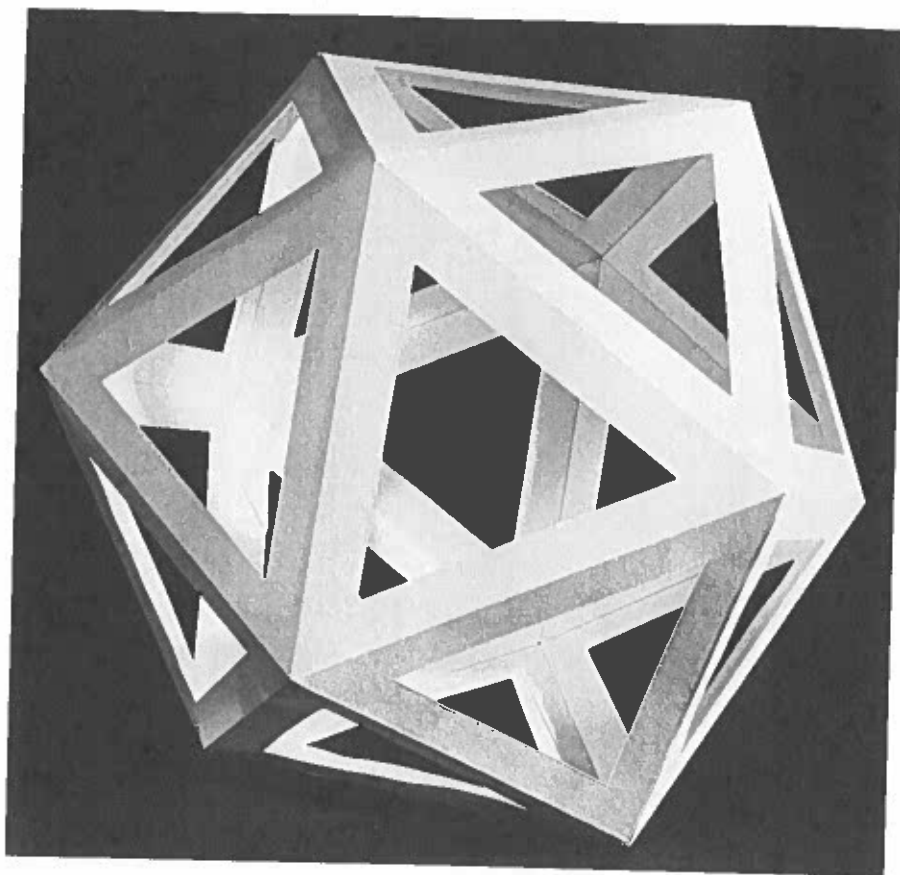
### Experiment 22

#### Flat Shapes

Select a geometric shape such as a triangle, circle or square, and cut out five to ten repetitive units, each one progressively smaller in size. Use medium- or heavy-weight paper (or cardboard) and a mat knife or circle cutter to make the

Elisabeth Sinken, *Flat Planes Become Spatial*, 1990. Cardboard. Courtesy the artist.





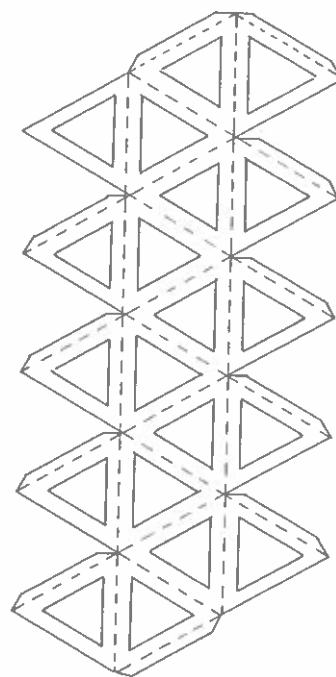
This open-form, skeletal icosahedron was produced by removing the interior spaces of the pattern prior to folding.

shapes. Cut and remove the interior portion of each flat shape to create a more open, skeletal structure as shown at right. Fit the units inside each other at alternating angles to produce a three-dimensional structure. Apply glue at touch points to adhere the shapes to one another. Notch some of the edges to join the shapes if desired. (See Joining by Notching, page 33.)

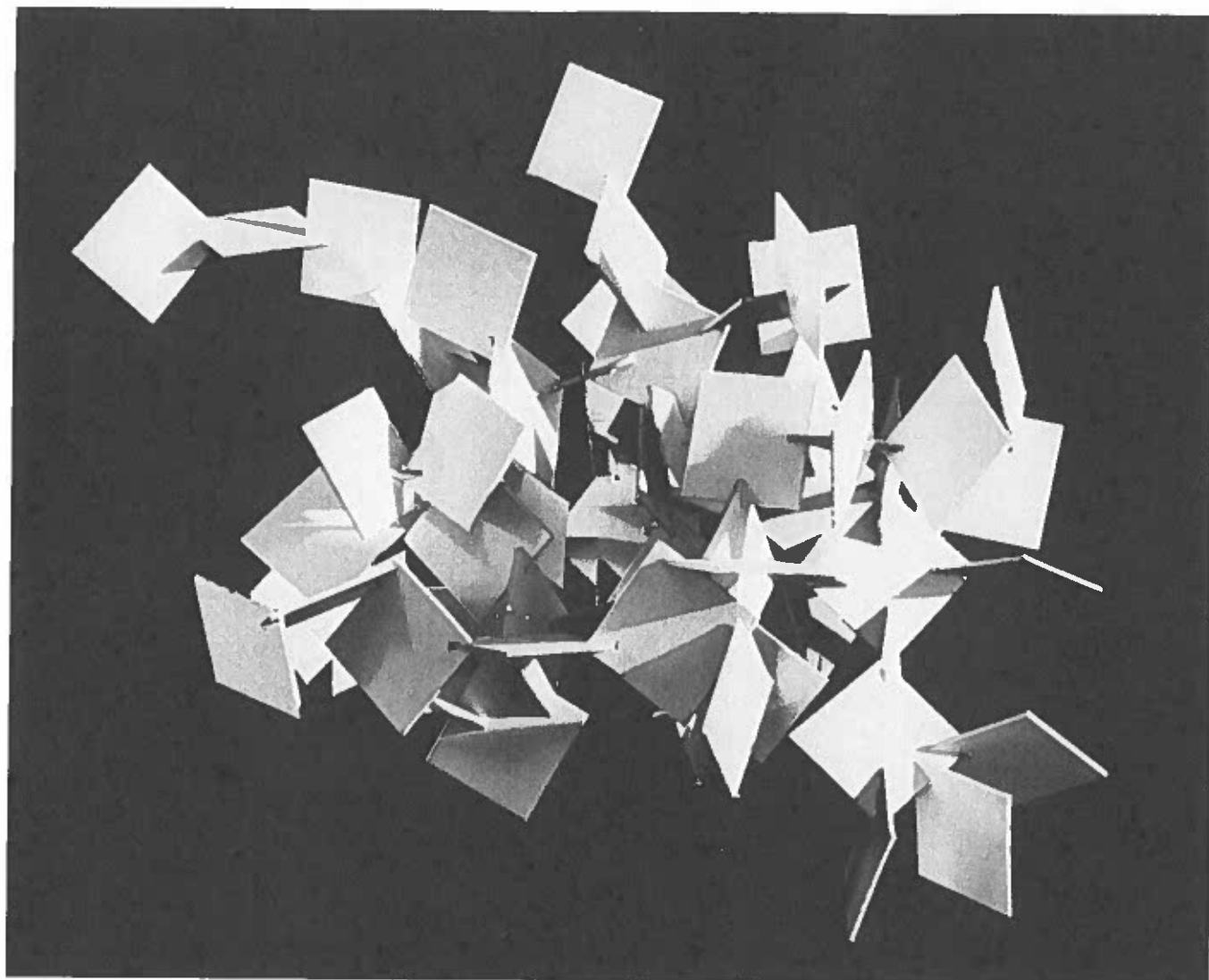
### Experiment 23

## Polyhedra

Refer to the patterns for making basic polyhedral forms, or forms composed of plane faces, that appear on pages 44 to 53. Before folding a pattern, use a mat knife to remove a large portion of the interior space, as in the illustration at right, so that the resulting shapes will be skeletal rather than solid when folded and assembled.



Pattern for constructing the skeletal icosahedron. Solid lines indicate cut lines. (Note that interior cut lines should be made with an X-acto knife and straight edge, while exterior lines may be cut with a scissors, if desired.) Crease and fold on the dotted lines, and apply glue to the tabs for fastening.



Square shapes cut from cardboard were notched and interlocked to produce this modular construction.

**modular** adj\mäj-a-lar\ 2: constructed with standardized units or dimensions for flexibility and variety in use.

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## Modules

A module is an individual unit of construction. Everything in our world is made up of modular units. Nature has ninety-two different elements, each with its own atomic structure, which are the building blocks—or modules—for all that nature produces. In the world of art, a module that repeats becomes a creative system for determining the shape and substance of a work, whether in sculpture, architecture, painting or furniture design. The artist invents with modules through the processes of grouping and serializing.