



## **A TEACHING TOY: FREE FORMS IN AN ABSTRACT LANDSCAPE**

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A thesis submitted to the faculty of Virginia Polytechnic Institute and State University in partial fulfillment of the requirements for the degree of Master of Science.

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I would like to express my gratitude to my committee for their guidance and support.  
I would also like to thank my family and friends for their love, encouragement, and patience.



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## THESIS INTENTION

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As a young student, I enjoyed a passion for the studio arts and an interest in art history. I ardently pursued these areas in college, continuing their exploration in graduate school in the field of Industrial Design. For the thesis project, my objective is to foster in children an appreciation for art and, possibly, to help them develop a critical and appreciative eye toward their environment. In my research, I find inspiration in child psychology and the toys of child's play, in 15th-century Islamic art and 20th-century Abstraction, and in naturally occurring events such as ivy twisting up a knotty tree trunk and soft ripples in a pond.

The assimilation of these elements, together with the ideas that they generate, evolve into the foundation for my project. My intent is to design a toy which provides children ages six to twelve years with insight into both the world of *nature* and the realm of art. Further, the toy will heighten each child's visual vocabulary to acknowledge the organic, natural line that exists in nature and which is, perhaps, represented in abstract art. These goals are the guiding principles for my work.





# INTRODUCTION



## the developing child

Early in my investigation of the world of play and child development, I read the work of child psychologist Jean Piaget whose insights about intellectual development eventually direct me to the appropriate audience for my thesis project. Piaget proposes that cognitive growth can be described in various stages. According to his work, this cognitive development results from experience and discovery, and is constructed by the activity of the individual. He recognizes the important role of objects as giving form to experience and consciousness. Piaget believes that children acquire knowledge through the touch, discovery and feel of objects. One structural period of intellectual development which Piaget describes is “concrete operational.” In this stage, a child aged seven to eleven is capable of engaging in “internalized mental action tied to objects and events in the ... immediate environment” (Ginsburg, Piaget’s Theory of Intellectual Development, 221-223). A child in this concrete operational stage of cognitive development will, for example, be able to engage in games and other rule-based activities as a “manifestation of concrete operations in the social sphere, corresponding to the appearance of conservation and other cognitive abilities” (Cole, The Development of Children, 480). The capacity to follow the instructions of many games further contributes to cognitive development by “creating structured circumstances within which children obtain practice balancing their own desires against the rules of society” (Cole, 480). Therefore, during middle childhood, children are prepared to reflect on and discuss their own thought processes, gaining a more complex understanding of themselves (Cole, 505).

The older child’s capacity to assimilate more experience into a growing knowledge base inspires me to develop an object that might foster their cognitive growth. Children in these middle years ranging from six to twelve “[become] more logical, deliberate and consistent, able to think through actions and their consequences” (Cole, 417-18). I therefore concentrate my focus on this older age group.

A second reason to develop an object for this age group is Piaget’s acknowledgment that the institution of schooling is an integral aspect of a child’s middle years. During this period, education supplies children with a powerful means of manipulating and organizing information, as well as understanding and relating to their environment. This idea inspires me to design an “object” that will fulfill my wish of bringing art within the child’s grasp and the educational framework in which to present it.

The object that can support my idea is a type of plaything which provides children with the opportunity to freely explore and express feelings about themselves and the world around them. Combined with art, this plaything may stimulate a new vocabulary of experiences from which the child can draw creative responses while strengthening an ability to observe, imagine and feel. I refer to this *body of experiences* throughout my thesis, often referring to it as an individual’s *landscape*, defined in the Oxford dictionary as a *prospect, view, or vista*. The word *landscape* describes the artists’ oeuvre and the child’s creative mind, to capture and express both their concepts of experience, the realm of imagination and the idea of physical presence, all critical to the stages of intellectual development proposed by Piaget.

“IMAGINATION IS MORE IMPORTANT THAN KNOWLEDGE.  
FOR KNOWLEDGE IS LIMITED, WHEREAS IMAGINATION  
EMBRACES THE ENTIRE WORLD, STIMULATING PROGRESS,  
GIVING BIRTH TO EVOLUTION.”

Albert Einstein



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## what is a successful toy?

After determining the age group for my project, as well as a sense of my objectives, I need to understand what constitutes a successful toy. I also want to see if these toys can be thoughtfully integrated into the learning process. An in-depth study of the toys designed over the last century reveals that the most popular and desired playthings are those that are not elaborate or complicated, such as battery operated toys or those with mechanical gadgetry. Often, these toys only require a child to watch, throw or shoot. Rather than providing scope for constructive, imaginative and creative play, these playthings seem to dictate certain usages and, therefore, are unable to sustain a child's interest over time (Garvey, Play, 110).

The playthings that last over the years, perhaps only rejuvenated by a change in material, size or color, are those that are challenging, yet not frustrating, and do not limit the child's imagination. Often, these are construction playthings, such as Tinker Toys, Lincoln Logs and building blocks, providing endless combinations of structures that entertain, delight and awaken curiosity. The key elements to these toys' longevity are their flexibility, simplicity of design, the infinite variety of expressive possibilities and their durability. These factors allow children to progress at their own rate, thus extending the play value of each toy. The young child, for example, can enjoy the activity of stacking while an older child is challenged by fitting the pieces together to create three-dimensional structures.

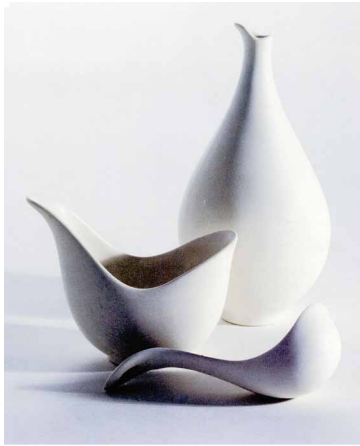
Other examples of playthings that retain their popularity are those promoting visual and perceptual skills such as pattern blocks, parquetry sets and puzzle cards. These toys encourage a child's visual experience through exploration and creativity, while inviting active making and thinking to further enrich the child's relationship to the environment.

The concept of pattern is one of the starting points of which a child, at any age, recognizes in the environment (Garvey, 56). This affinity is not only for the formal elements — space, color, line and shape — which the child encounters through direct sensation, but also exists in terms of the non-visual experiences, thereby engaging one's thought processes through perception, invention and discovery. Piaget believes that each experience challenges the existing knowledge base, creating a sense of “equilibrium” that, when balanced, results in new knowledge that prepares the individual for the next cognitive challenge. This progressive cognitive growth is based in part on experience with the environment, and for a child to develop an understanding “he must construct it himself, he must re-invent it” (Piers, ed., Play and Development, 27).

The object is to provide information about art to children six to twelve years old. It is not my place to teach art, but to encourage them to explore the art world through play. My approach is to design an intelligent, playful object that will facilitate children's learning about art, excite their imagination and, in turn, affect how they interact with their own environment.

Further investigation towards my goal of arousing curiosity and encouraging creative thinking directs me to the work of professor and psychologist Mihalyi Csikszentmihalyi. In his book Creativity, he proposes that creativity is “a combination of flexibility, originality and sensitivity to ideas which enable the thinker to break away from usual sequences of thought into different and productive sequences, the result of which gives satisfaction to himself and possibly to others.” Applying this idea to my young audience, I am determined to hold the attention of the child and encourage freedom of thought. If the toy I design promotes an enjoyable, familiar yet unique art learning experience, children will feel more comfortable in expressing themselves using their new knowledge.

## what is my toy?



1 Eva Zeisel. *Soup, bowl and spoon*, c. 1930.

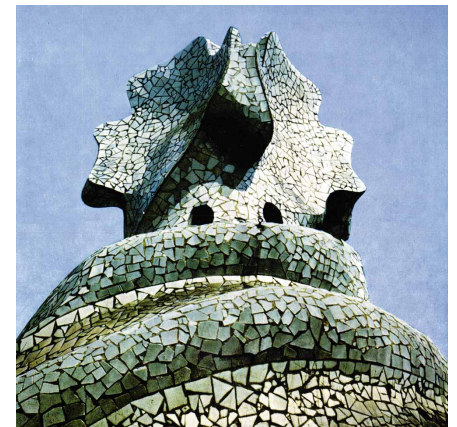
The shapes created by the abstract artists originate in the organic world, are infused with aspects of geometric form and, ultimately, are invented by the artist.

The shapes of my toy share a similar thrust to those of the artists, yet I identify my forms with a specific title. The name “*harmonic forms*” defines the blend of curvilinear and linear contours describing the soft, rhythmic shapes that are to compose the essence of my toy, *Free Forms*. With the addition of these *harmonic forms* to the familiar, geometrical world of shapes, the child’s constructions may reach a new level of imagination and variation.

With an introduction to abstract art and to the concept of ordering the elements of form into significant relationships, the child will have the opportunity for new experiences from which to learn and observe. Knowledge and curiosity open one’s eyes to see, interact and understand and, by using the *harmonic forms*, to express these components through the creation of three-dimensional environments. The child’s ability to thoughtfully interpret experiences with *Free Forms* and relate them to the environment may extend to other encounters with art forms.

Before initiating the design process, I decide to concentrate on a single genre of art. I choose 20th-century abstraction because it is a period known for its diversity, playfulness and freedom of expression. The art is described as the “systematic expression of deep and spontaneous ‘images’ or ‘impulses’ that are subjective, emotional, and, therefore, immediately transferable” (*The Artful Eye*, 160). I am especially drawn to the artists’ imagery, often derived from *nature*, rendered with unpredictably odd shapes and presented in dream-like space. The shapes created by the abstract

As children become more aware of their surroundings, they may question what they see and thereby acquire a sensitivity to the visual and tactile aspects in their environment. They may wonder at the great height of a skyscraper or the perfect pattern of a spider’s web. They may be moved by the curve of a stone wall, amazed by the brilliant colors on a fall day or drawn to caress the smooth texture of a flower petal. Through their intimacy with art using *Free Forms*, the child may further associate these experiences to those found in nature or, possibly, make connections where none have existed before.



2 Antonio Gaudí. *Casa Milà*, Barcelona, 1905-10.

The basic idea for my product is a toy that introduces children between the ages of six and twelve to 20th-century abstract art while stimulating creativity and imagination. This knowledge of the basic elements of form - line, color, dimension and contour - may provide children with a means of communicating their own vision. For instance, the child may express ideas through the activity of stacking, patterning or constructing, as the toy varies in more than one physical dimension. Through the arrangement of the *harmonic forms*, together with the elements of form, the child may explore the concept of parts functioning together in a system to determine a whole.

Determining the framework for the toy leads to an interpretation of the artists’ landscape, the extent of his experiences and imagination. Narrowing the focus to three artists, I am able to study their different approaches to rendering forms in the abstract, as well as to examine the visual expression of their *landscape*.

## meeting the artists

The French artist Yves Tanguy creates compositions by breaking down large forms into irregularly shaped components. The results are bodies of forms with pierced, attenuated or notched limbs drawn together to form a “compact mass like a puzzle sphere” (Yves Tanguy). His palette of colors is vibrant and rich, with dramatic contrasts of light and dark to accentuate his limitless shapes.

Although Tanguy paints on a two-dimensional canvas, his shapes exist in relation to one another and form an unplanned pattern of interlocking structures that create the illusion of a three-dimensional realm.



3 Yves Tanguy. *Du Vert au blanc*, 1954.



4 Jean Arp. *Gnome*, 1930, bronze.

Jean Arp, another French 20th-century artist, derives his forms from the natural world, describing them as vegetative, biological shapes. His work is reflective of his search for a means of expression because he views himself as both artist and explorer. His art is a combination of spontaneity and order, compositions of straight lines, curved figures, geometric and abstract shapes, all flowing in an undulating rhythm.

By adhering to his belief that the “removal of boundaries is the road which leads to the essential,” Arp’s art inspires a world of mystical vision (Lejwa, ed. [Jean Arp](#)).

The Dutch artist M.C. Escher builds a three-dimensional environment within a two-dimensional plane. However, he does so with the suggestion of movement, perspective and texture through the manipulation of line, light and shadow. With the use of chiaroscuro, Escher creates the illusion of volume and depth, his play of textures supplies rhythm while his line conveys strength. He is a master of employing the visual elements, such as color and value, to offer the viewer a variety of visual perceptions and experiences. Escher’s art is the result of contrasting elements, yet the interaction results in a work that, when played together, contributes to a powerful, harmonic whole.

Escher had visited the Alhambra in Spain as a young artist and, as evidence of the experience, he embraces the use of pattern as a means of organization and unity. He also employs repetition of shape, form and motifs in his work, often symmetrically, to provide a sense of order and proportion. With finesse, Escher engages both complex and sophisticated thought processes, celebrating the power of the elements in the development of form and structure in his art.



5 M.C. Escher. *Snakes*, 1969, woodcut.





In the artists' development of both two- and three-dimensional art, the organization of the various elements such as line, color, shape and perspective establishes visual harmony and order to produce visual excitement. Their works are *landscapes* of dynamic arabesques, sensual contours and vibrant colors, compositions of complex spatial relationships defined by both geometric and abstract forms.

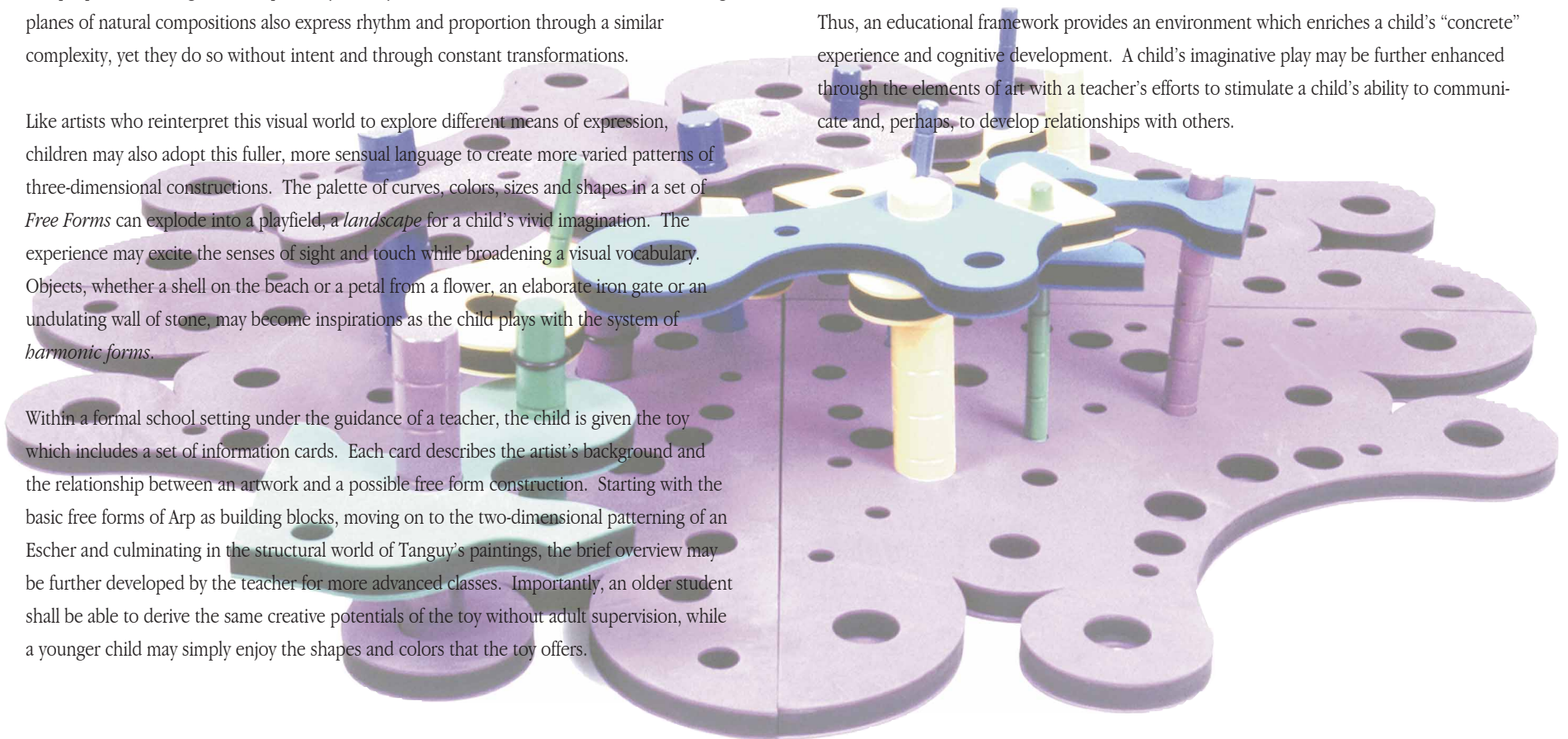
The forms found in the work of the abstract artists engender an appreciation for balance and proportion through their imposed symmetry and order. The soft curves and free-flowing planes of natural compositions also express rhythm and proportion through a similar complexity, yet they do so without intent and through constant transformations.

Like artists who reinterpret this visual world to explore different means of expression, children may also adopt this fuller, more sensual language to create more varied patterns of three-dimensional constructions. The palette of curves, colors, sizes and shapes in a set of *Free Forms* can explode into a playfield, a *landscape* for a child's vivid imagination. The experience may excite the senses of sight and touch while broadening a visual vocabulary. Objects, whether a shell on the beach or a petal from a flower, an elaborate iron gate or an undulating wall of stone, may become inspirations as the child plays with the system of *harmonic forms*.

Within a formal school setting under the guidance of a teacher, the child is given the toy which includes a set of information cards. Each card describes the artist's background and the relationship between an artwork and a possible free form construction. Starting with the basic free forms of Arp as building blocks, moving on to the two-dimensional patterning of an Escher and culminating in the structural world of Tanguy's paintings, the brief overview may be further developed by the teacher for more advanced classes. Importantly, an older student shall be able to derive the same creative potentials of the toy without adult supervision, while a younger child may simply enjoy the shapes and colors that the toy offers.

The interaction between adults and children is considered by child psychologists to be an important aspect of the learning process (Garvey, *Play*, 127). The stimulation of an activity, coupled with the discussion it engenders, serves to heighten the child's experience and encourage new ideas. Piaget believes that the guidance given by the teacher or parent does not inhibit the child's freedom to make individual discoveries; rather, it is a form of encouragement which helps the child acquire confidence and establish a creative foundation for future endeavors.

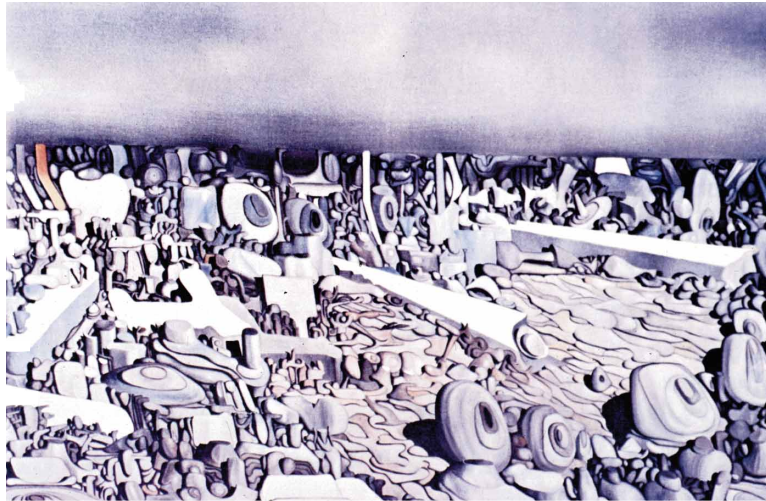
Thus, an educational framework provides an environment which enriches a child's "concrete" experience and cognitive development. A child's imaginative play may be further enhanced through the elements of art with a teacher's efforts to stimulate a child's ability to communicate and, perhaps, to develop relationships with others.



## THE ARTISTS' LANDSCAPE



### tanguy's vision: atmosphere



6 Yves Tanguy. *Legendes ni figures*, 1930.

The landscape of artist Yves Tanguy is a dynamic field which is home to abstract forms, soft lines and undulating curves. It is a two-dimensional, dream-like world where Tanguy denotes a three-dimensionality by organizing the basic elements of form to create a place of stability. He adds to this three-dimensional stage the characteristics of natural forms to establish a playful, lively and expressive atmosphere which invigorates the senses.

This unique realm entices the viewer by revealing an endless field of organic forms in a futuristic setting. Tanguy's *landscape* is the foundation for his dreams, a canvas for the artist's exploration of thought and life.



7 Yves Tanguy. *Multiplication des Arcs*, 1954.

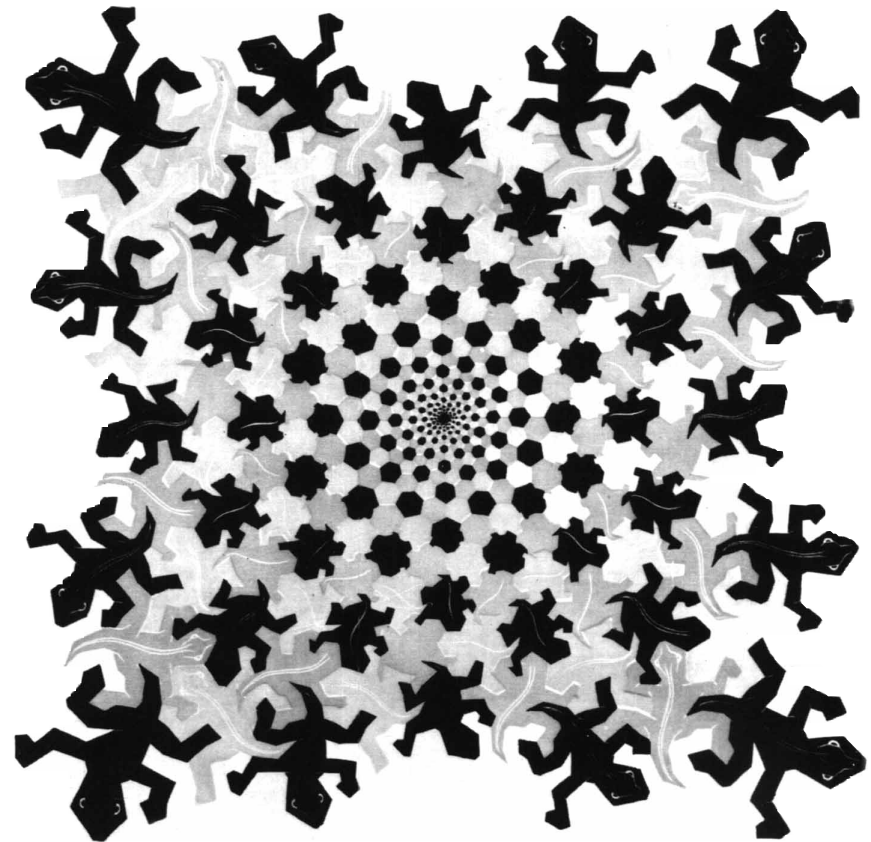
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## escher's metamorphosis: r h y t h m

Although Escher works in a two-dimensional plane using little or no color, his art, like Tanguy's colorful paintings, approaches and even captures the world of three-dimensional space. An example of Escher's ability to manipulate our visual senses is evident in his process of metamorphosis to approach the realm of infinity. This technique of transformation can be defined as a visual study and a continuous development of forms. His vague, abstract shapes gradually become sharp, concrete forms or, as in the illustration **Development II**, solid hexagons become scampering lizards. Through a playful combination of form, content and color, Escher's metamorphoses allow for endless possibilities of form, expression and pattern.

The technique also allows for different interpretations of the print. The viewer is able to read from either the top or bottom, or from either the center or the outside. Whichever the direction, the figures appear to develop naturally from the previous shapes. Escher creates new associations and intriguing connections for the viewer, providing an opportunity for one to see the visual relationships through the manipulation of the hexagon. The result is a body of work that defines rhythm, harmony and order while expressing imagination, elaboration and exploration.

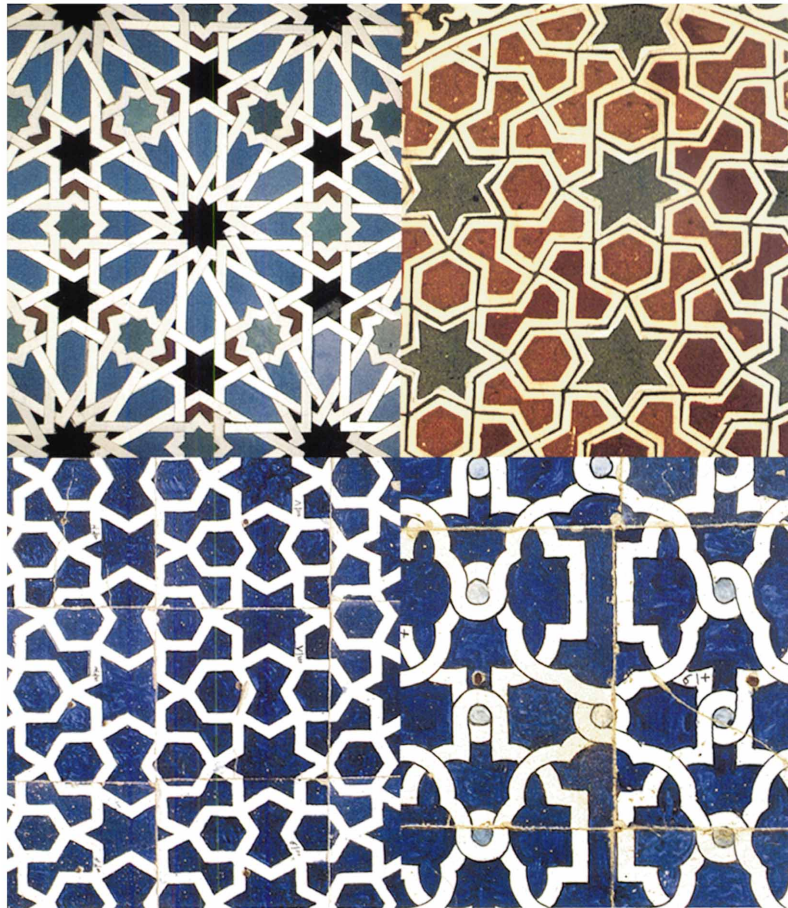
It is Escher's unique process of transforming a flat, two-dimensional page into a three-dimensional environment that makes his prints so valuable in my study and design of three-dimensional forms.



8 M.C. Escher. *Development II*, 1939, woodcut.



## to the alhambra: pattern



9 Moorish tiles from the 15th-century. Geometrical patterns derived from the square and the hexagon.



A further inspiration is found in the art of 15th-century Spain. The elaborate system of painting two-dimensional patterns on tiles results in a mosaic landscape that embodies the elements of color, texture, pattern, line and rhythm. The final composition is a repetition of a motif that fills an entire surface.

Early mosaics are depictions of either geometric shapes or abstract lines because in the Islamic culture human representations are forbidden. These geometric shapes evoke a sense of order and stability. Curvilinear lines and natural forms, in contrast, provide a sense of freedom and sensuality, offering the viewer a setting which is conducive to meditation and reflection.

Mosaic art is both a systematic and creative approach to expressing the many attributes of form. The combination of repetition, color, geometry and arabesques gives depth and meaning to a two-dimensional form. Through its infinite exploration of space, color and line, pattern provides a powerful example of how the manipulation of forms results in a variety of relationships that exist harmoniously to create a multitude of landscapes.



10 Top: Geometric border pattern found at the 15th-century Alhambra Palace in Andalusia, Spain.  
Above: Typical ceramic tiles of Moorish design.

## arp's language: animation

The work of Jean Arp is a subtle transition of planes that awakens the senses. He has a gift for understanding how variations in shape, position and depth can become creative means of expression. Arp describes his groups of related figures of varying size and scale as experiments in a "quest for a new language of form."



11 Jean Arp. *Pour Parler*, 1954, painted wood.

His is a language of freedom and imagination developed through the playful animation and interaction of solids. The constant transformation of fluid, organic forms that undulate smoothly and the abstract articulation of geometric figures produce a dynamic order of lines and surfaces, oppositions and connections.



12 Jean Arp. *Fruit and Flower*, 1962, painted wood.

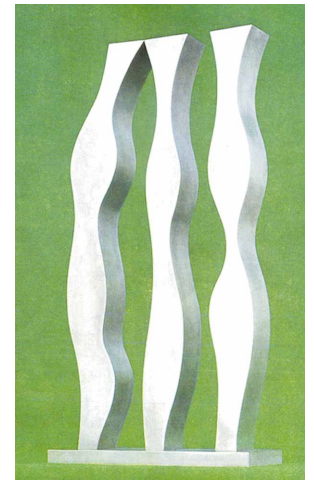
## arp's sculpture: volume



13 Jean Arp. *Fruit of a Stone*, 1959, marble.

Jean Arp transforms his wooden relief sculptures into fully-rounded sculptural configurations of bronze and stone, establishing a relationship between form and material.

His three-dimensional work is an intensive interplay of forms and surfaces that exist within a visual, tactile and imaginative environment. It is a world of fantasy and imagination that is created from both natural and artificial forms that indicate at once harmony and tension. In Arp's forms there is a playful freedom that extends beyond merely a carved stone on a cylindrical base; rather, his sculptural figures are reminiscent of a pebble in a brook or a cloud in the sky.

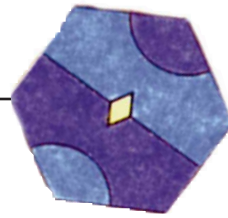


14 Jean Arp. *The Three Graces*, 1961, stone.



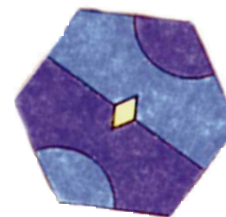
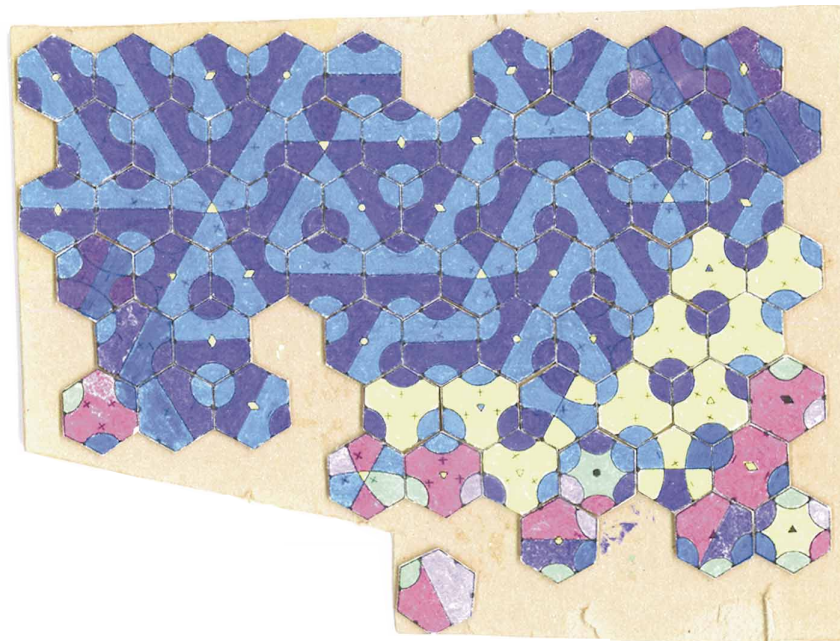
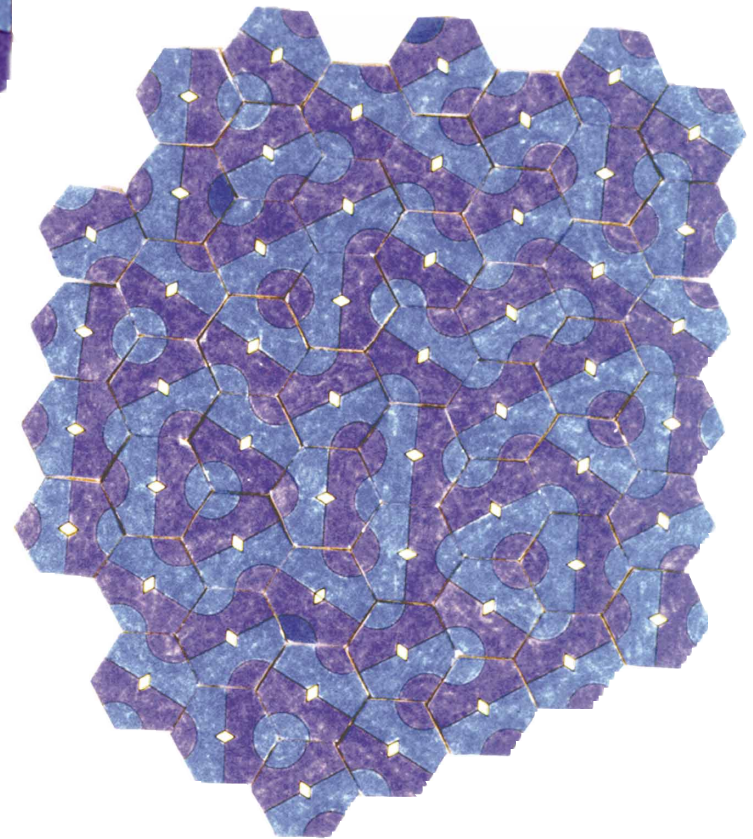
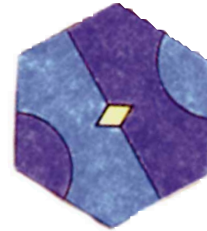
## EARLY IDEAS

### puzzles, patterns, geometry



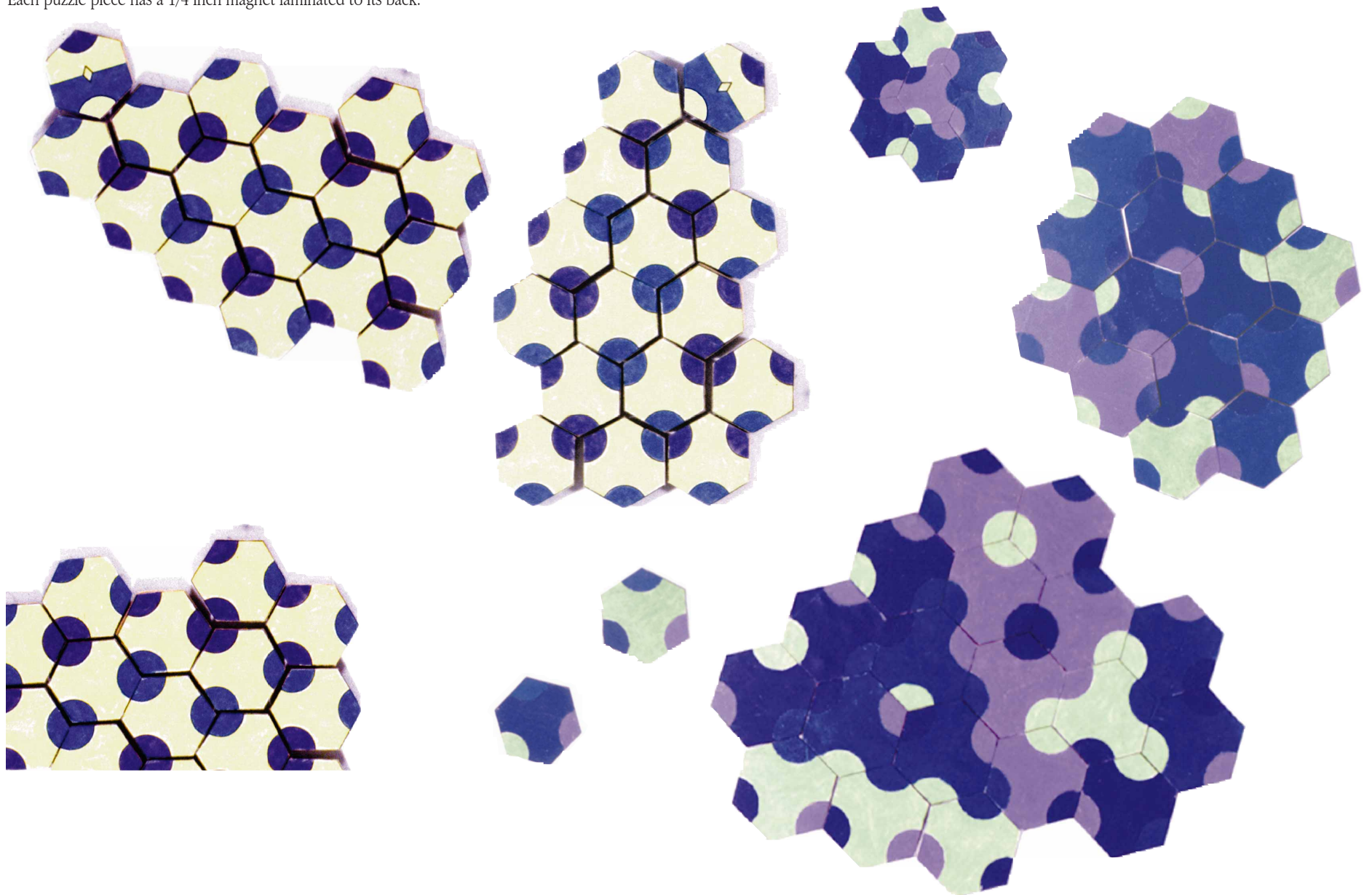
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The investigation of both the puzzle-like etchings of M.C. Escher and the infinite patterns to be discovered in the Alhambra tiles pave the way for the first designs. In each of the art forms, the result of blending straight and curved lines is a pattern that is at once simple and complex, drawing one's eye to distinguish patterns within patterns. Changing the placement, rotation or color of a tile is enough to alter the final pattern. The six-sides of the hexagonal figure allow the child to join the tiles together in a variety of ways to create different patterns. Diversity will be an important aspect of the final toy as a further means of arousing a child's curiosity.





Each puzzle piece has a 1/4 inch magnet laminated to its back.

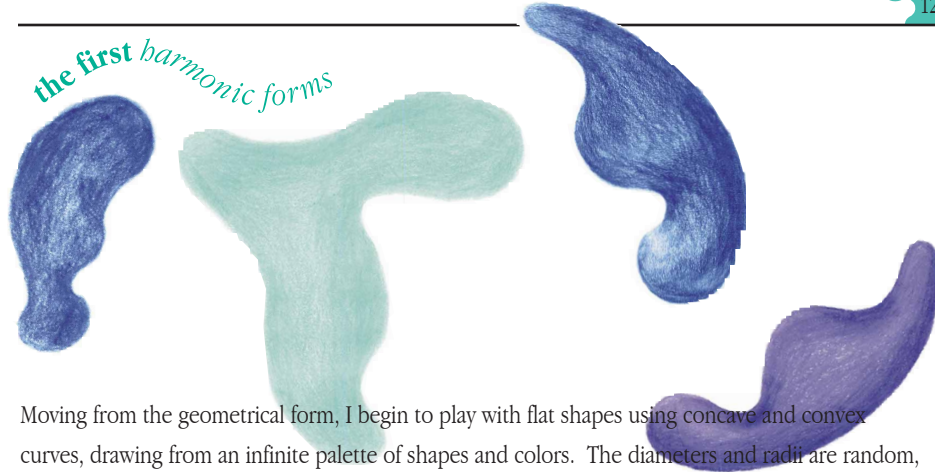




## A SENSE OF THE FREE FORM

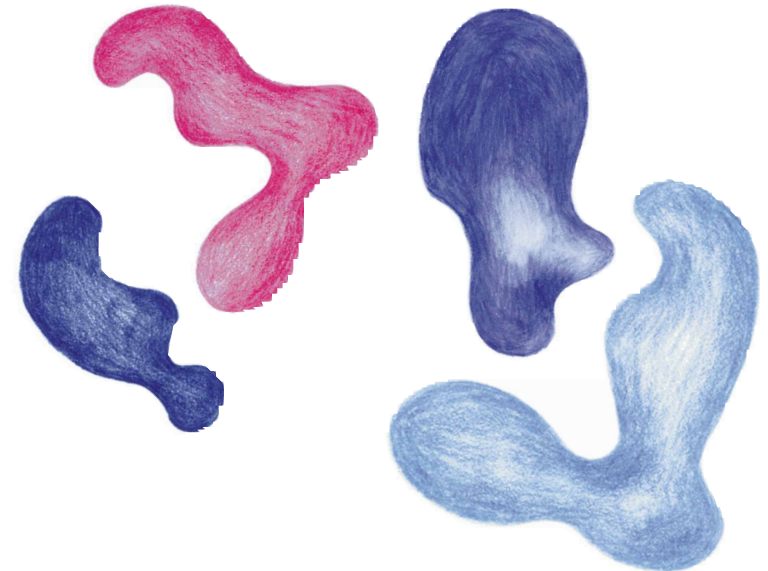


the first harmonic forms



Moving from the geometrical form, I begin to play with flat shapes using concave and convex curves, drawing from an infinite palette of shapes and colors. The diameters and radii are random, keeping the forms fresh and free.

However, this lack of control provides neither a sense of relationships nor a feeling of cohesiveness when the forms are joined. The shapes need some unifying elements to inform a *landscape*.



## identifying the shapes

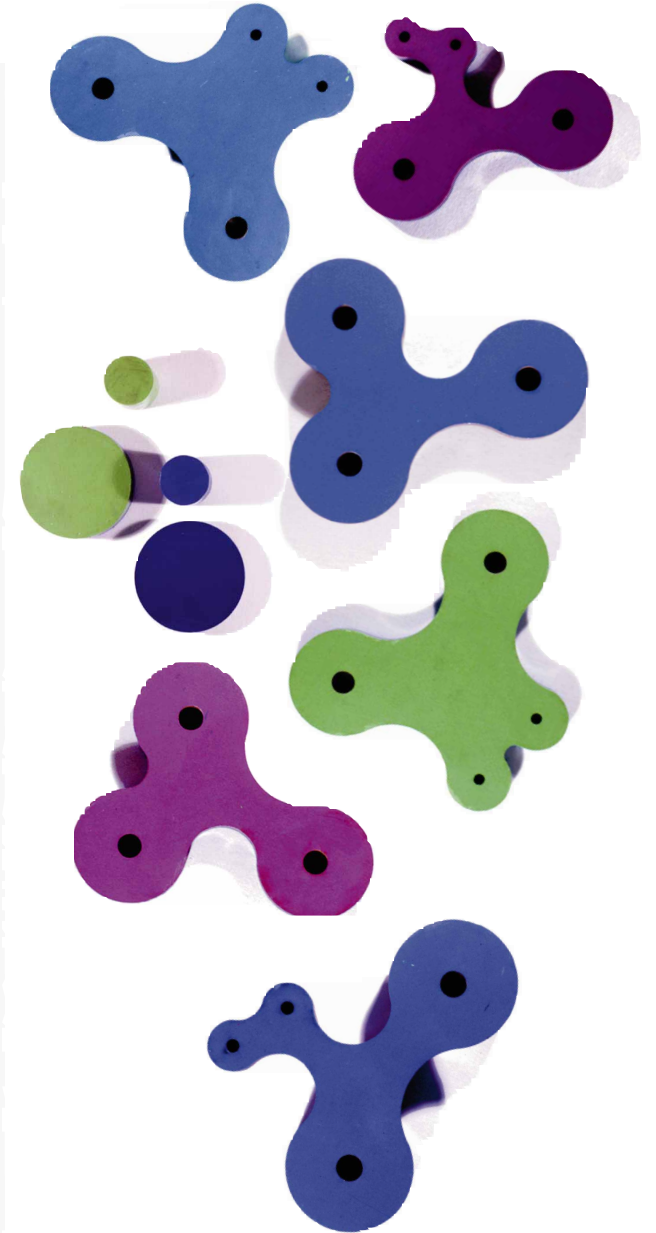
Narrowing down the number of forms to three provides order and a sense of unity.



Three-dimensional models in clay and cardboard with wooden dowels as an early connection mechanism. The dowels anchor the forms while allowing for rotation.

## models

Masonite models with acrylic paint, in subtle shades of blue, purple and green, have holes of 1/4 inch and 1/2 inch diameters for the painted wooden dowels.





## stability: bases and dowels

The first bases are cut from a  $\frac{3}{4}$  inch wooden board and divided into sections. Aware that a variety of hole diameters can better challenge children during the construction process,  $\frac{3}{4}$  inch, 1 inch and 1  $\frac{1}{4}$  inch holes are added to the bases.



**experimenting with material**

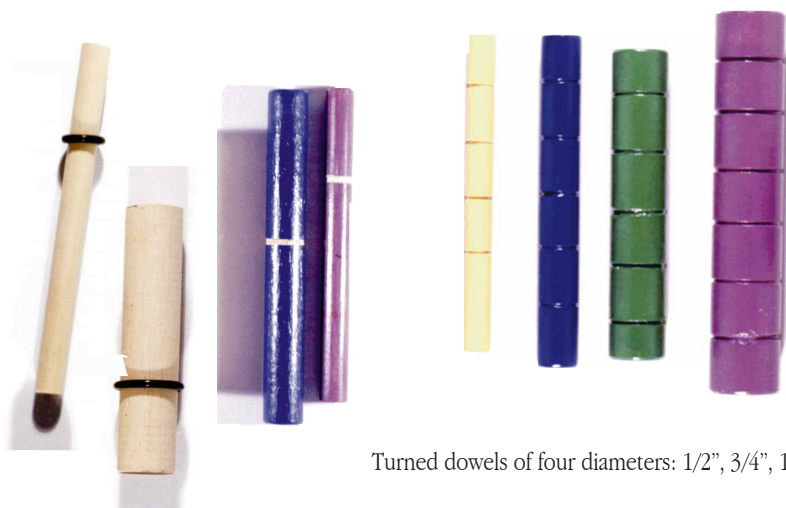
The set of new shapes are made of a 1/4 inch lightweight foam material and have hole diameters of 1/2 inch, 3/4 inch, 1 inch and 1 1/4 inch. The white sheet is pliable, still relatively sturdy and easy to move along the dowels.



Foam sheets in blue, purple and green are laminated to the surfaces of the forms.

## anchoring the forms

The foam material slips smoothly over the dowels, yet the forms do not always stay anchored. Turning grooves down the length of each dowel and adding rubber washers and o-rings to lock into the grooves hold the forms in position.



Turned dowels of four diameters: 1/2", 3/4", 1" and 1 1/4".





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playing with curves and colors



## a thicker form

Substituting a 1/2 inch white rubber sheet for the 1/4 inch white foam gives the forms a three-dimensional solidity that is missing from the earlier models. However, placing these shapes flat and constantly rotating them does not create a significant pattern, the unifying element or *landscape* for the toy.

Reviewing the different groups of shapes I have been designing during the development process, there is not one set that interlocks to produce a pattern in the two-dimensional plane. Since the toy is to be available to children at different levels between the ages of six and twelve, as well as have a variety of construction possibilities in the vertical and horizontal planes, the puzzle aspect is an integral part of the final toy.



## SEARCH FOR A PATTERN

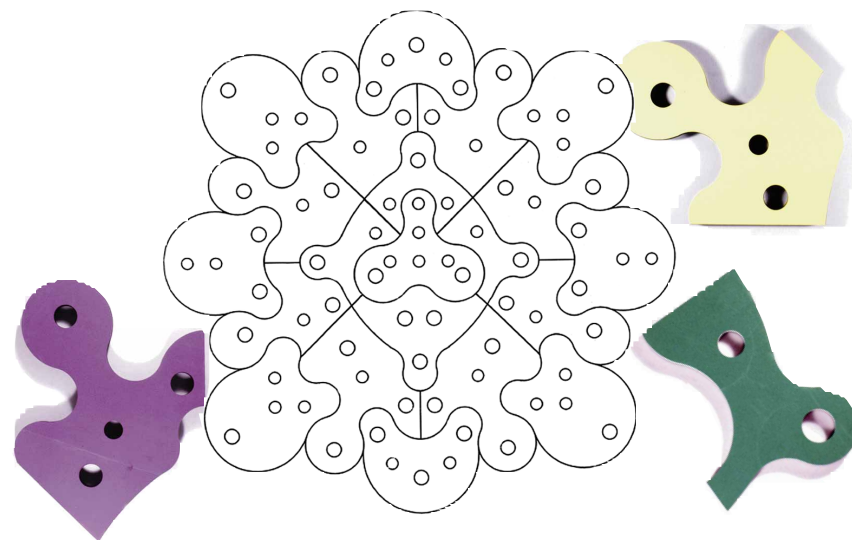
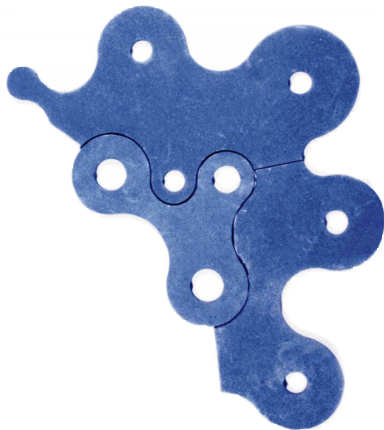
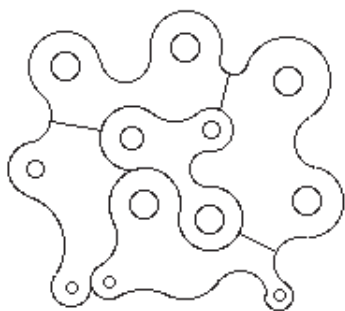


### the straight line

The first pattern is a simple, two-dimensional group of five shapes with both curved and straight edges.



Pattern is cut from plastic and foam sheets.



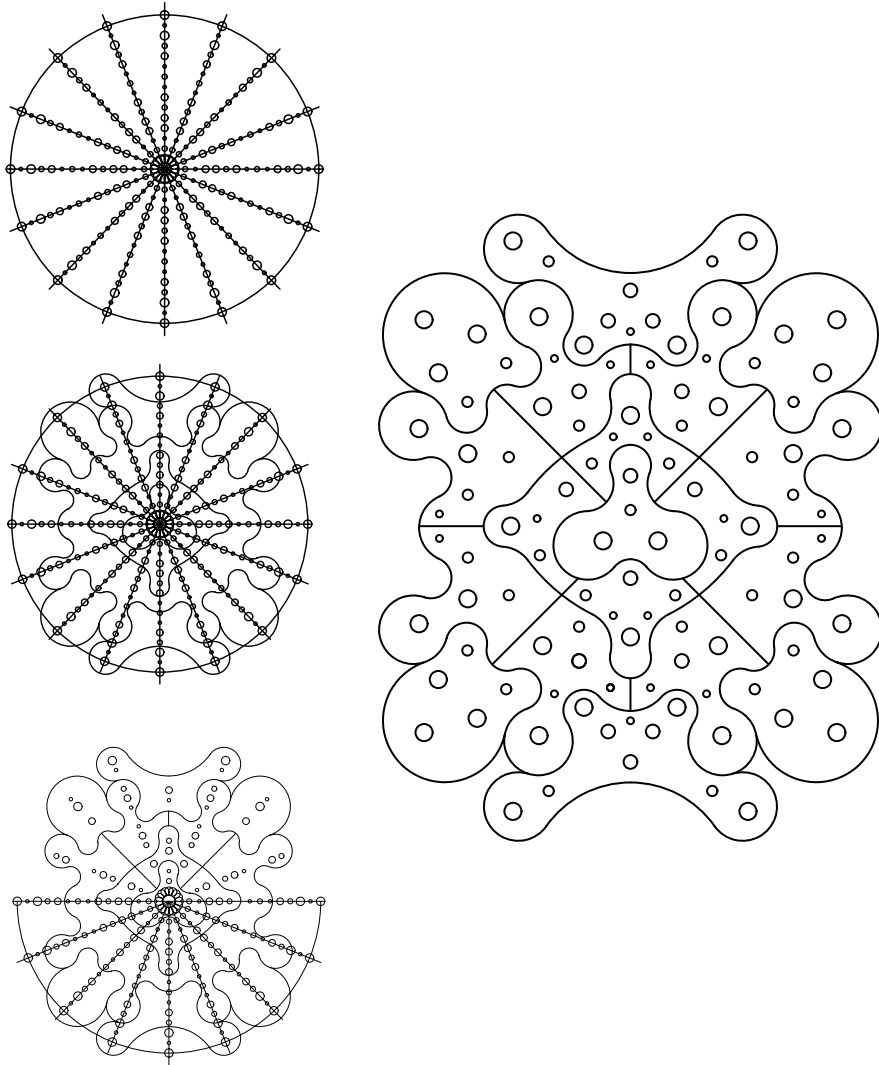
A more systematic approach to designing the two-dimensional puzzle is to repeat shapes, develop a pattern for the placement of the dowel holes and to apply straight lines to symmetrically divide the pattern.



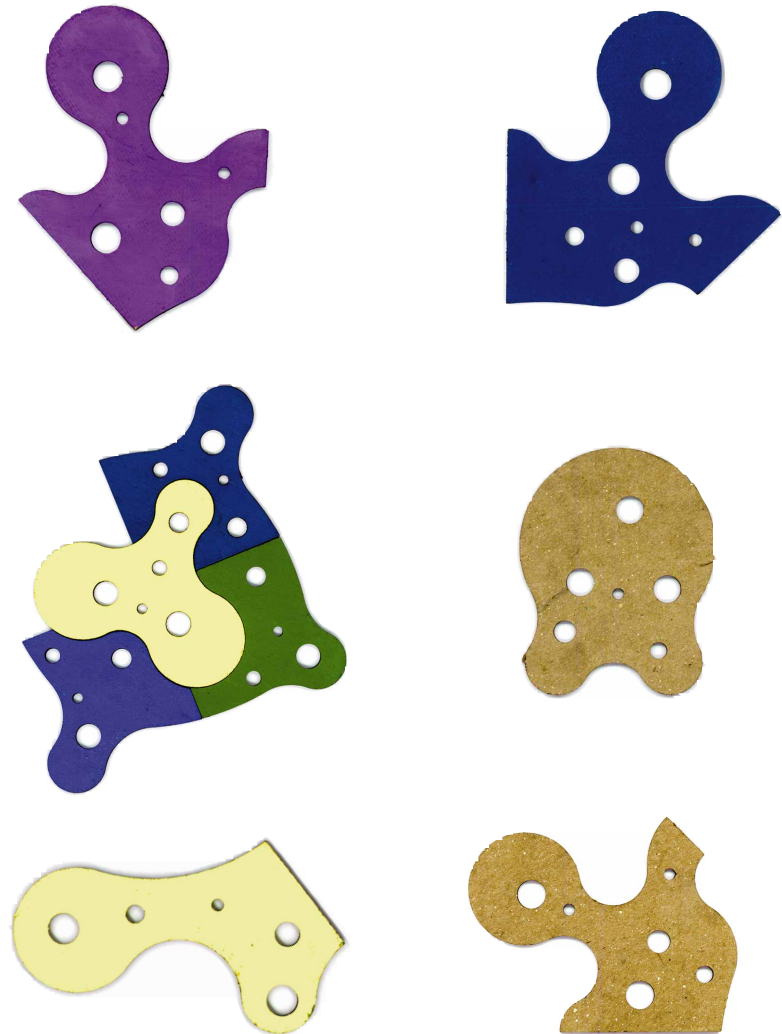
Pattern is cut from 1/2" white and black rubber sheets.



## the grid system



First grid s for design of hole pattern.

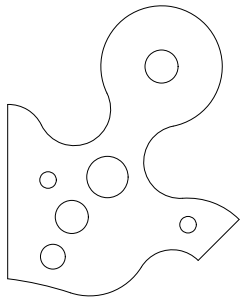
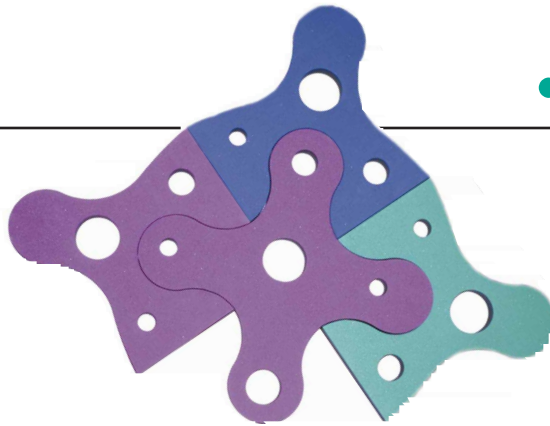


To experience actual size, the pattern is cut from thin cardboard.

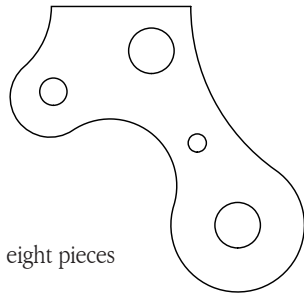


# DISCOVERY

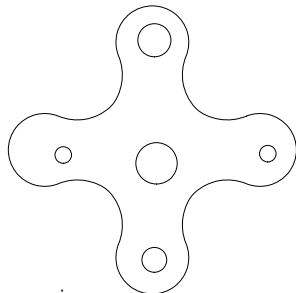
## the pattern



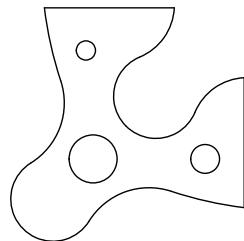
eight pieces



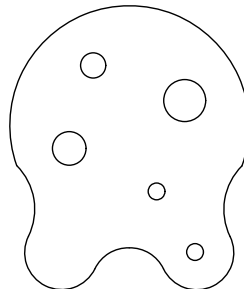
eight pieces



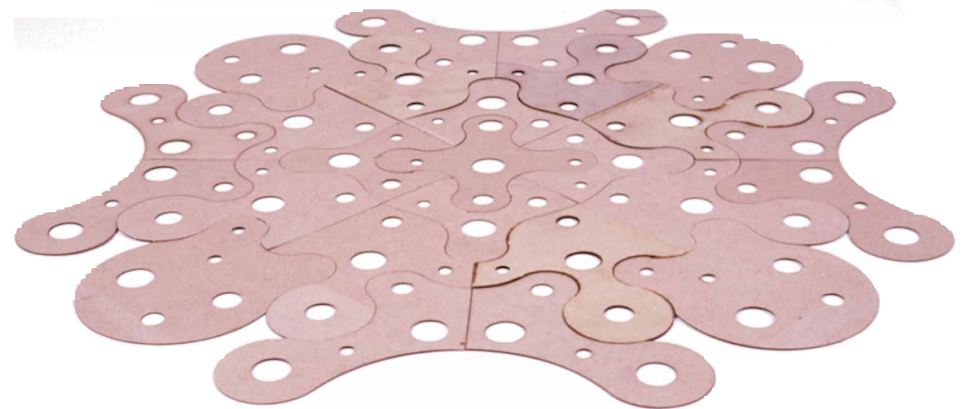
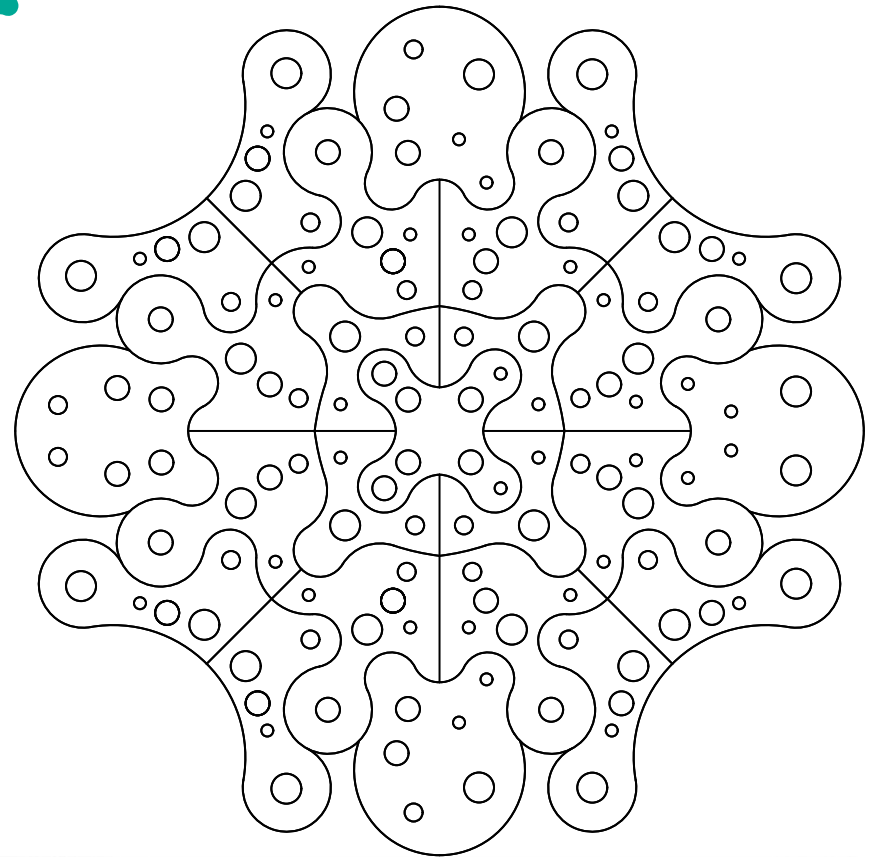
one piece

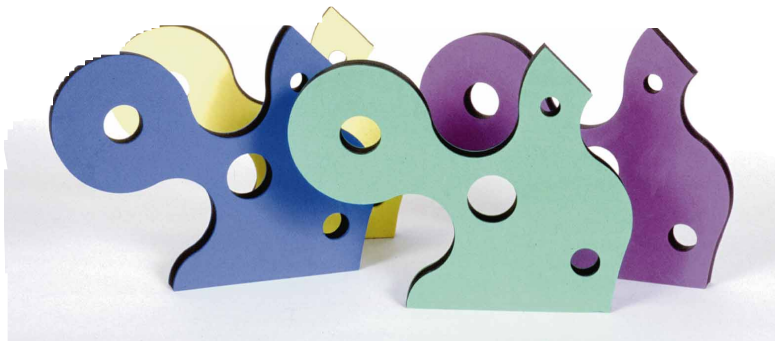
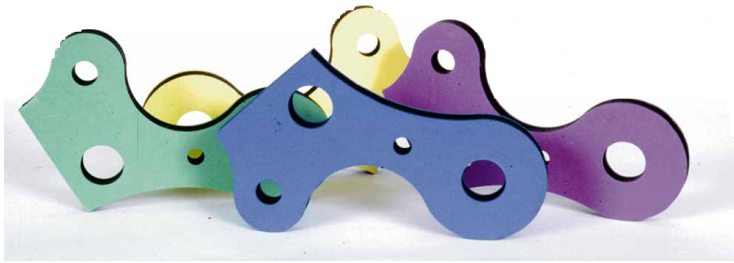


four pieces



four pieces





*the final harmonic forms*



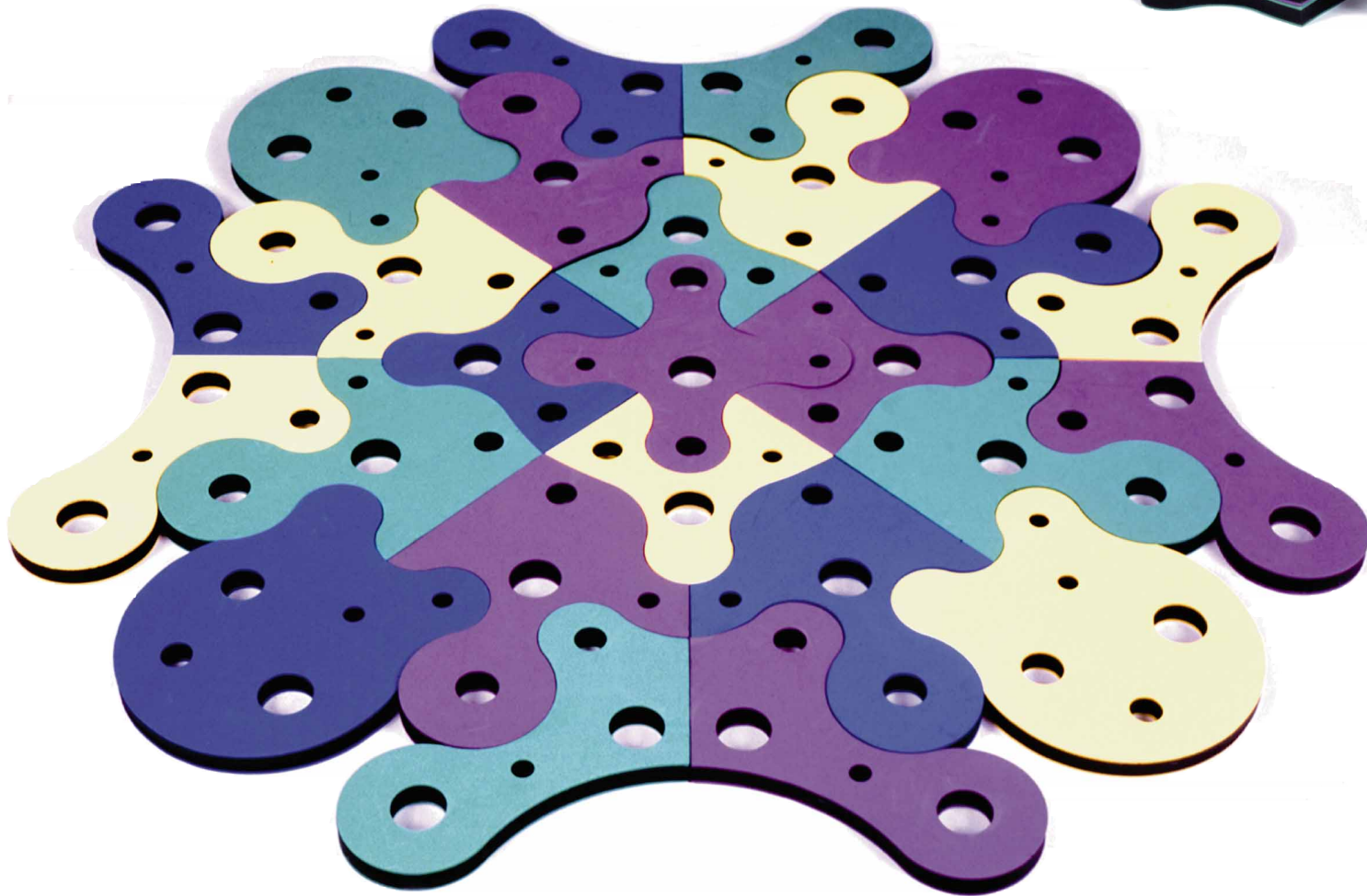
The result of my investigation is a final set of twenty-five interlocking shapes made of 1/2 inch black rubber with colored foam, each with a similar series of holes. One of the twenty-five pieces is singular to the set, while the other twenty-four have matching mates.

The number and placement of the holes per shape depends on the size and contour of the particular piece. However, all twenty-five shapes share at least two holes of different diameters placed equidistantly from another. The number of holes for each shape runs from three to six, and the sizes relate directly to the four sizes of the dowels.



## the two-dimensional puzzle

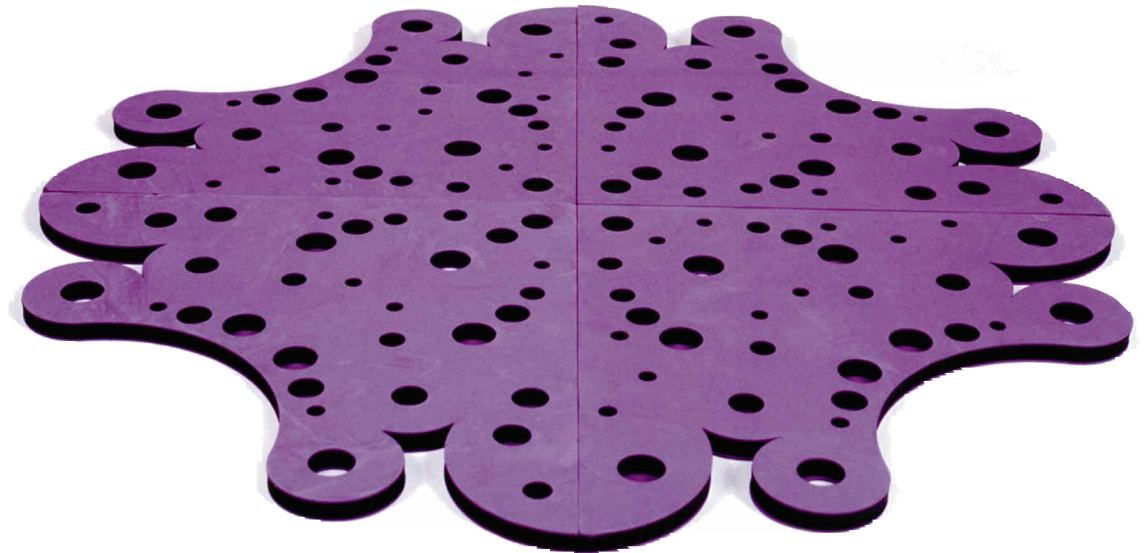
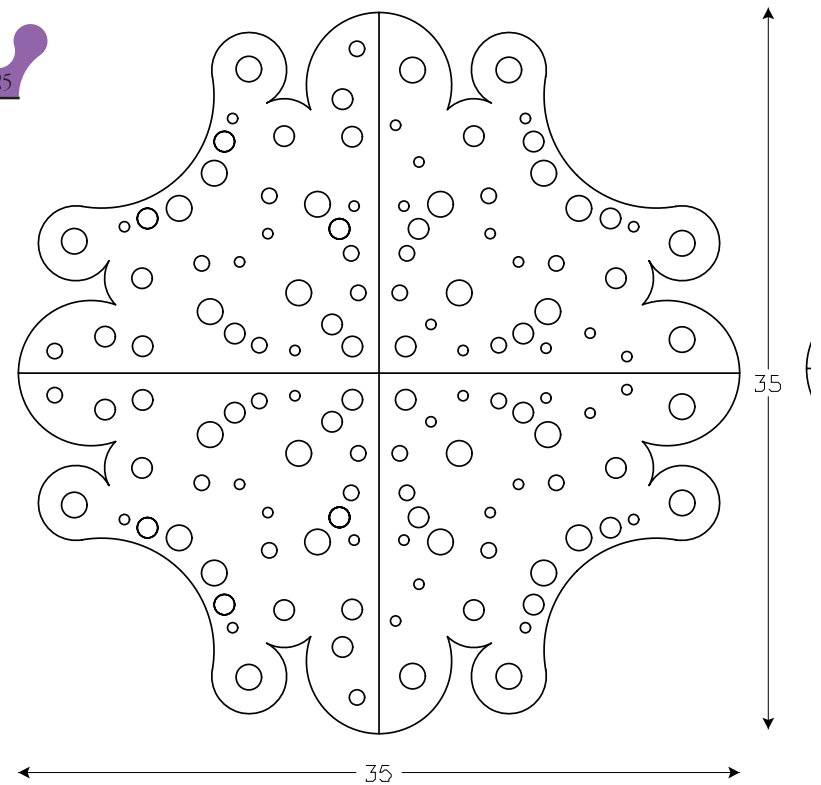
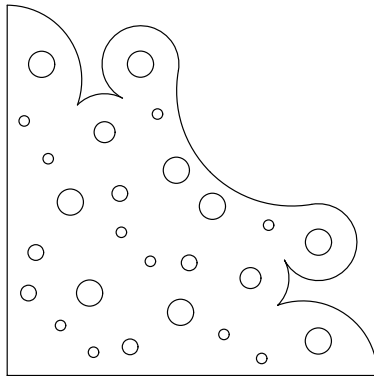
The twenty-five *harmonic forms* fit together to create a puzzle in the two-dimensional plane.



## laying the foundation

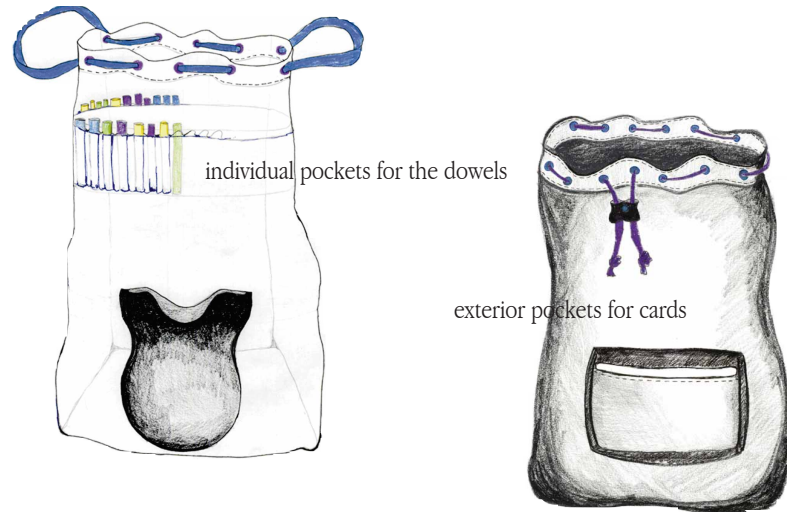
The foundation for *Free Forms* is made of the same black rubber and purple foam as the puzzle pieces. The material does not add much weight to the set and the dowels fit snugly in the holes.

The full base echoes the contour of the final, two-dimensional puzzle pattern and is divided into four sections, each with a pattern of holes directly related to those of the corresponding shapes. The total foam pieces of the set include the twenty-five *harmonic forms* and these four sections.



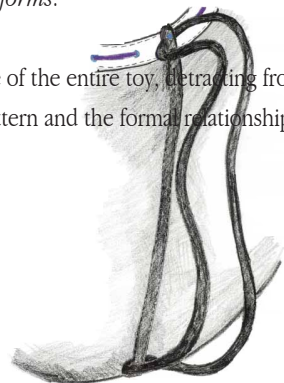


## the “bag”



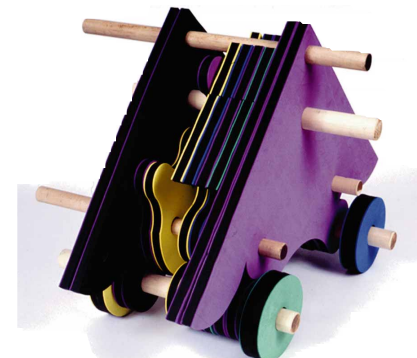
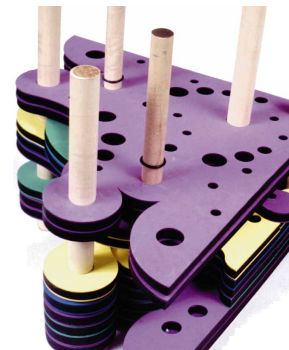
The first package design is a bag based on the back-pack. The lightweight, sturdy, black mesh material is silk-screened with images of the *harmonic forms*.

However, the shapeless bag lacks the structural nature of the entire toy, detracting from the highly organized symmetry of the two-dimensional pattern and the formal relationships of the shapes.



## the toy as package

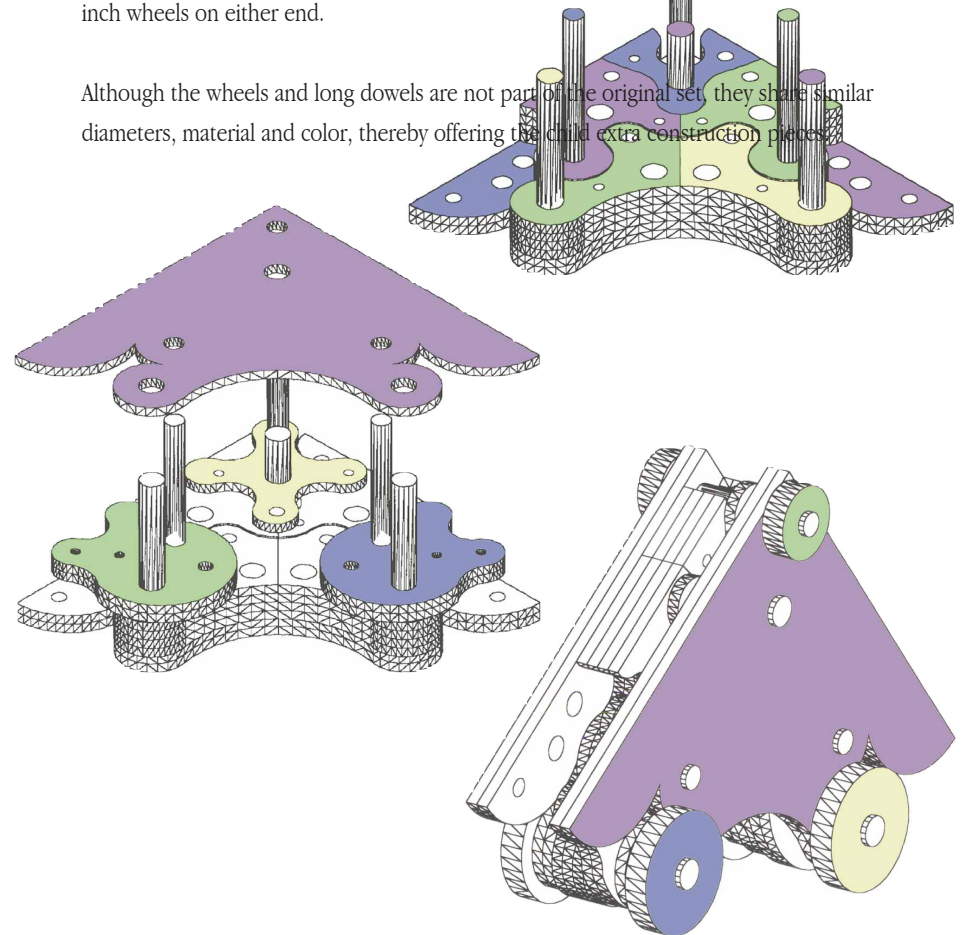
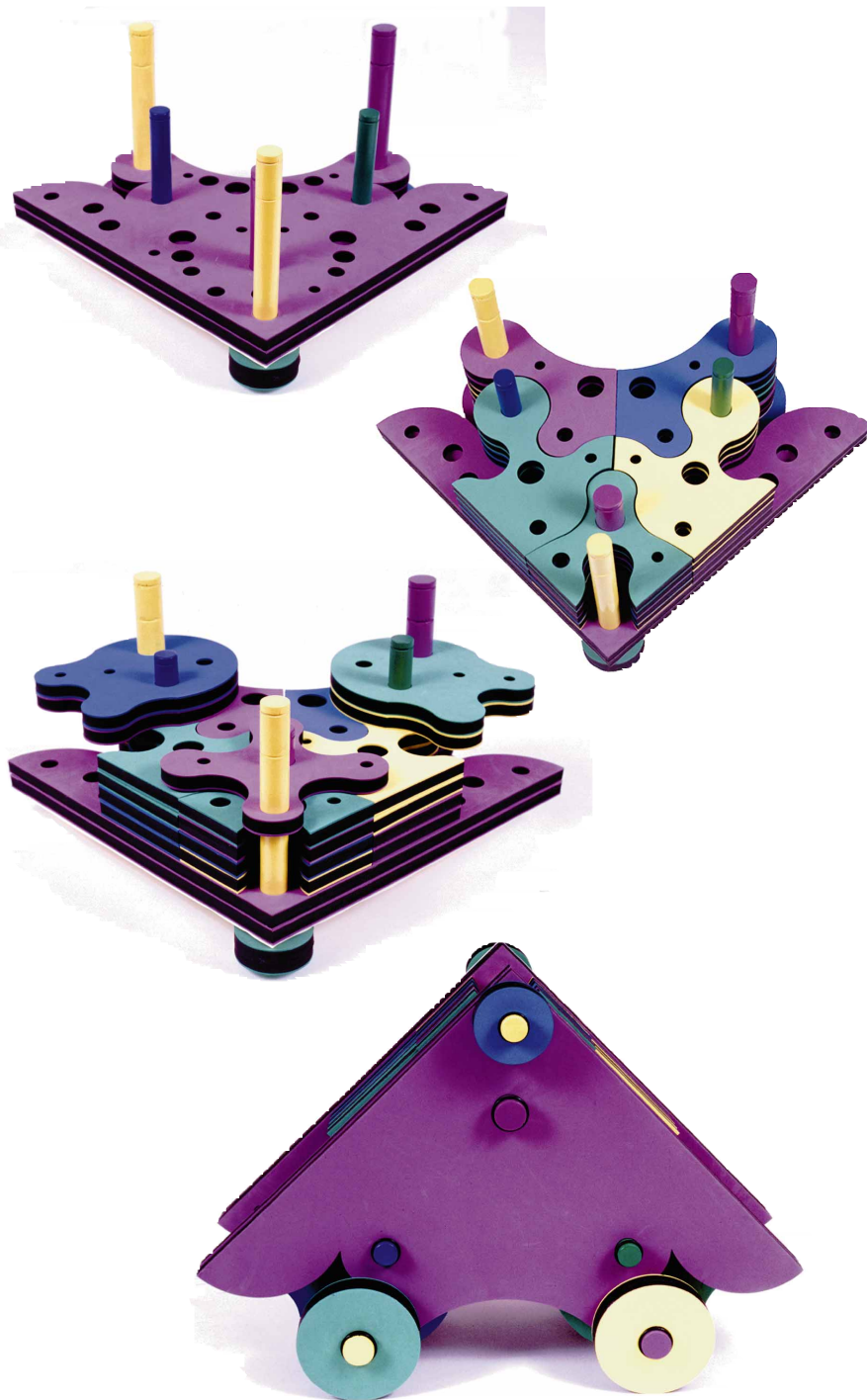
The objective is to design the package to be an integral part of the toy, thus the toy itself will provide its own packaging. Since the forms are meant to be stacked, the package needs a foundation between which the four bases and twenty-five puzzle pieces can nestle. The four flat bases are relatively solid and become the exterior walls to support the forms.



## the stacked toy

There are few additional pieces for the packaging. Six long dowels, three of 1 inch diameter and two of 3/4 inch diameter, run through the stacked forms and bases to hold them securely in place. Adding o-rings to the ends of each dowel keeps the package compact and sturdy. Four, 2 inch wide wheels are placed on the bottom dowels with o-rings capping off each to hold the wheels in position. The top dowel is the handle for carrying the toy and has two 3/4 inch wheels on either end.

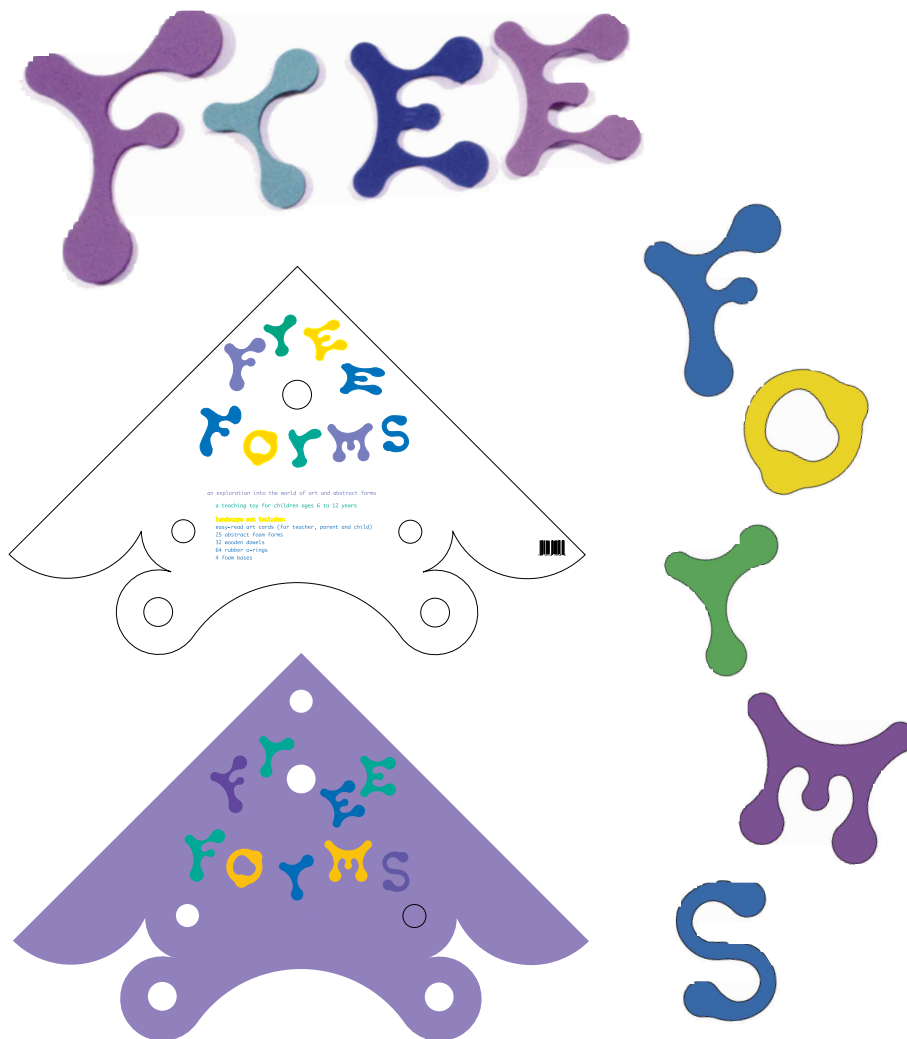
Although the wheels and long dowels are not part of the original set, they share similar diameters, material and color, thereby offering the child extra construction pieces.



## the stacked toy



## what's in a name?



Development of the logo.



## THE DOWEL BAGS

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### a special package

The final toy has two sets of 16 dowels that allow for one or more children to play with the toy at the same time without adding excessive weight to the final package.

The packages are a lightweight, black mesh material. One side has four pockets, similar to an apron, with the dual purpose of also holding the o-rings when not locked on the dowels. The other side has an elastic, 3/4 inch band sewn across the middle of the strip with 32 individual areas for each dowel to fit in snugly.



## THE FULL TOY

### up and running

The bags are placed down the length of the toy, the weight of the dowels resting along the edges of the bases. Each bag has an elastic band around the top which wraps securely around the wheels of the handle. Although the toy can be easily held and the weight is manageable, a smaller child may push it, rolling the toy smoothly on its four wheels.



## the art cards

Information provided on card:

1. Name of Artist — dates, country of birth
2. Style of Work — mediums of expression, brief account of place in 20th-century art
3. Relationship of work of art to *Free Forms*
  - a. *Harmonic form* similar to shape used by the artist.
  - b. Possible *Free Form* structure student might devise.
  - c. First step in construction. Study of form, color and verticality.
  - d. *Harmonic forms* in two-dimensional puzzle. Study form, color and symmetry.
  - e. *Harmonic forms* and full base in three-dimensional structure. Study elements of the *landscape* using *Free Forms* and artist's work.



JEAN ARP

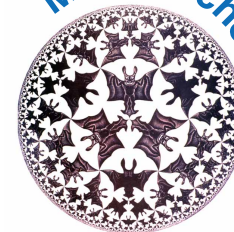
Jean Arp (1886 - 1966) was a French writer, painter and sculptor. He worked in wood, bronze, marble, plastic and stone.

Arp designed shapes that related to natural forms such as plants, eggs, amoebas and vegetables.

Comparing Arp's bronze sculpture *Torso Fruit* with one of the **harmonic forms**, there is a similarity in the curves, edges and flowing line that relate to one another.



M. C. Escher



Maurits Cornelis Escher (1898 - 1972) was a Dutch artist from the Netherlands. Most of his works are prints such as woodcuts, india ink on guache and lithographs. He also used pencil, watercolors and ink.

Comparing Escher's print of *Circle Limit IV* (1960) to a two-dimensional puzzle design using the **harmonic forms**, there is a similar focus on pattern, symmetry and repetition.





## playing with “free forms”

Finally, I have created an object in which imaginative growth may take place through greater awareness and sensitivity to the elements of form. The use of the toy, with the accompanying cards, may provide children with the opportunity to fully explore abilities and the potential for creative thinking. If I have heightened the child's perceptual encounter with art, thereby facilitating cognitive development and providing enjoyment, I have achieved my goal.



## PICTURE CREDITS

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- 1 Eva Zeisel: Designer for Industry. Montreal, 1984.
- 2 El Jardí dels Guerrers. Manel Armengol.
- 3, 6, 7 Yves Tanguy: Catalog of an Exhibition. Acquavella Galleries, 1974.
- 4, 12, 13, 14 Jean Arp. Robert E. Mates and Paul Katz, New York.
- 5 M.C. Escher: His Life and Complete Graphic Work. Gemeentemuseum, The Hague, 1992.
- 6, 7 Yves Tanguy: Catalog of an Exhibition. Acquavella Galleries, 1974.
- 8 The World of M.C. Escher. Gemeentemuseum, The Hague, 1968.
- 9 Moorish Style. Francesco Venturi, KEA London.
- 10 Moorish Style. Found in Volume II of Owen Jones and Jules Goury's Plans, Elevations Sections and Details of the Alhambra, published in 1845.
- 11 Art of Jean Arp. Graindorge Collection, Liege.

(Page 31) *Torso Fruit*, Jean Arp. Robert E. Mates and Paul Katz, New York.

(Page 31) *Circle Limit IV*, The World of M.C. Escher. Gemeentemuseum, The Hague, 1968.



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- . Yves Tanguy. New York: The Museum of Modern Art, 1972.
- Yves Tanguy: Catalog of an Exhibition. New York: Acquavella Galleries, Inc., 1974.

## V I T A

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