

Woodson Art Museum

in your classroom

Origami Inspired: Imagination and Innovation in Paper
Winter 2013



Star Tessellated Dress and High Heels, Linda Tomoko Mihara, single sheet of parchment for dress and each shoe, 2010

Introduction

This winter the Woodson offers a dramatic exploration through the world of paper-based art with two exceptional exhibitions on view through April 7, 2013. *Folding Paper: The Infinite Possibilities of Origami* and *Calvin Nicholls: Paper Sculpture by Design* present enticing examples of contemporary paper sculpture, whether folded and formed or cut and carved.

Dynamic, innovative, and exquisite — the art of origami exceeds the boundaries of craft. The collection of objects included in *Folding Paper* presents origami as a sophisticated fine art form exhibited in museums and sought after by individual art enthusiasts and collectors. The first major exhibition to explore the rich tradition of paper folding both in Japan and Europe, *Folding Paper* features approximately 140 works by 45 international artists.

Calvin Nicholls: Paper Sculpture by Design features the relief sculptures of Canadian artist Calvin Nicholls, who creates realistic animal portraits through a painstaking process of cutting and gluing tiny strips of paper to create three-dimensional artworks. Nicholls will be in residence at the Woodson Art Museum March 5 through 9.

Paper Sculpture by Design

Nicholls combines a passion for wildlife with his artistic abilities in design, photography, sculpture, and model making to create paper sculptures that are the result of talent, time, and precision. Nicholls relies on careful study of a subject's anatomy and physiology and incorporates this information as the foundation for his sculptures. Using scalpels and small leather-working tools Nicholls slices heavy paper into small shapes and bits of paper that are then gingerly layered on top of one another using tiny amounts of glue — applied with a toothpick.



Calvin Nicholls, *Tree Frog*, 1999



Calvin Nicholls, *Lynx*, 2004

During his Woodson residency, Nicholls meets students during class visits to the Museum and leads public programs. For more information on Calvin's residency programming, please see the information at the conclusion of these materials.

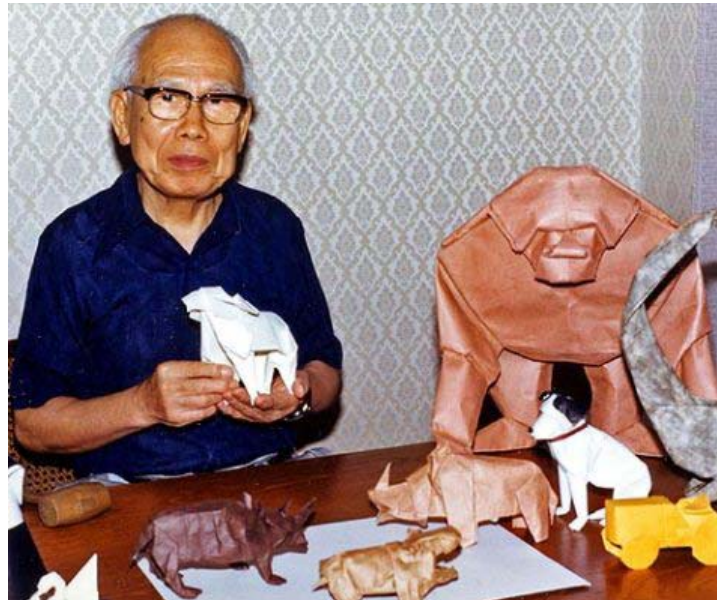
What Is Origami?

**Origami educational materials created from information provided by exhibition organizers, International Arts & Artists.*

Origami translated from Japanese means "folding paper." "Ori" means folding and "kami" (spoken "gami") means paper. The crane is likely the most famous origami fold and has become a symbol of the global peace movement. Contemporary paper folding is a far cry from the simple folded animal forms so many of us loved as children. Today, origami inspires innovative concepts in math and design, and inventions in engineering, architecture, and technology.

Paper was introduced to Japan via China around the 6th century A.D. and Japanese paper folding is assumed to have begun shortly afterward. Rooted in the ceremonial world, most notably in the native Shinto tradition, priests performed purification rituals using zigzag strips of folded white papers known as shide.

Paper folding developed in the secular world of Japan amongst the upper classes. Gifts exchanged by royalty and the wealthy often were wrapped in decorative folded paper. Paper folding as a pastime arose under the Imperial Court of the Heian period (794-1185). A little-known European tradition of paper folding also existed, and after Japan adopted the German kindergarten system in the late 19th century, both Eastern and Western paper-folding techniques were incorporated into the Japanese curriculum as a method of developing children's mathematical, artistic, and manual skills.



Akira Yoshizawa (1911-2005) (pictured at right) is credited with elevating origami to an art form. The first professional origami artist, Yoshizawa developed thousands of new designs and pioneered the art of wet folding, a technique that allows for the sculptural modeling of details. By the 1950s, his work was featured in numerous publications and in 1954 his book "Atarashii Origami Geijutsu (New Origami Art)," propelled him to fame. In this book, Yoshizawa introduced a system of notation for origami folds, which has since become the worldwide standard for paper-folding instruction. The same year, he

founded the International Origami Center in Tokyo and began holding origami exhibitions overseas, serving as a cultural ambassador for Japan. Yoshizawa later wrote seventeen more books on origami, and in 1983, Emperor Hirohito awarded him the Order of the Rising Sun, a profound honor and a highly prestigious decoration.

Another famous figure in the history of origami is Sadako Sasaki (1943-1955). Sasaki was the catalyst for turning the most famous origami form — the crane — into a symbol of world peace. The crane has been popular with origami enthusiasts for more than 400 years. According to Japanese legend, those who fold over 1,000 cranes are granted one wish. In the 1950s, origami cranes were indelibly linked with the valiant struggle of Sadako, a young Hiroshima girl who was two years old when the atomic bomb was dropped.

Hospitalized at 12 years old with leukemia caused by the bomb's radiation, Sadako began folding cranes in the hope that she would be granted her wish to live. Sadly, although she was able to fold all 1,000 cranes, she died in October 1955. A monument to her was erected in the Hiroshima Peace Park and is permanently embellished with garlands of colorful cranes folded in her memory by school children around the world.

Types of Origami

Several styles of origami are represented in *Folding Paper*, as diverse as the artists' imaginations and as dynamic as the paper from which it is crafted.

Representational Origami: one or more sheets of paper folded into an animal, flower, or figure from the real or supernatural realm.



Eric Joisel, *Mask*, 1999, paper, folded wet and coated, on wire

Geometric Origami: There are two main types of geometric origami — modular origami and origami tessellations.



Linda Tomoko, *Peace Sphere*, 1996, 18 cranes folded from a single sheet of paper

Modular Origami: multiple sheets of paper are folded into individual units and then assembled into a larger, more complex geometric structure. These structures, created using mathematical calculations, are held together by friction or tension, such as that created by inserting flaps from one module into pockets of another.



Daniel Kwan, *Six Interlocking Pentagonal Prisms*, 2010, 90 rectangles of paper

Origami Tessellation: a pattern fills a plane with no overlaps or gaps, like decorative wall tiles, often created using pleats to connect elements such as twist folds in a repeating fashion. Many origami tessellations have the appearance of woven paper.



Christine Edison, *Mother and Child*, 2009, Wyndstone marble paper

Origami Terms

Backcoating: a process in which two colored sheets of paper are glued together to create one two-toned sheet of paper.

Crane: in Japan, this bird is fabled to live for 1,000 years and is a symbol of longevity, fidelity, and peace. Legend has it that folding 1,000 cranes will grant you one wish.

Crease pattern: a map of the major folds in an origami design.

Computational origami: the study of what can be done with a folded sheet of paper.

Ikebana: the Japanese art of flower arrangement.

Kabuki: a classical Japanese theater movement featuring elaborate costumes and stylized dramas.



Makoto Yamaguchi, *Characters from the Kabuki Play 'Renjishi'*, 2005, yuzen paper

Kaden: gift wrappers, which usually feature black strings and are given at funerals.

Kami: higher beings who control nature and can take up residence in trees, rocks, rivers, and mountains.

Knotology: a technique developed by Heinz Strobl (b. 1946, German) in which paper strips are knotted into flat pentagons layered on one another, and then woven and plaited to make models that, like his *Snapology* figures, are stable without the use of glue or tape.

Mecho: female butterfly origami fold used in traditional Japanese wedding ceremony to represent the wife.

Noshi: a small auspicious charm usually made of carefully folded red and white paper.

Papiroflexia: paper folding (Spanish), a term coined by Vicente Solórzano Sagredo (1883-1970), a physician with a passion for paper folding.



Ocho: male butterfly origami fold used in Japanese wedding ceremony to represent the husband.

Order of the Rising Sun: awarded by the Emperor of Japan for services to the nation. This is a profound honor and a highly prestigious decoration.

Orizuru: folded cranes.

Polyhedra: geometric solids in three dimensions with flat faces and straight edges, varying in complexity.

Renzuru or *Roko-an*: the technique of folding multiple cranes from a single sheet of paper.

Sake: rice wine.

Shide: white, zigzag-shaped paper strips associated with Shinto rituals.

Shinto: the indigenous religion of Japan.



Shishi: Chinese guardian lions.

Shugi: envelopes or gift wrappers which are usually tied with red and gold-wrapped paper strings and are given for celebrations such as weddings.

Snapology: a technique developed by Heinz Strobl (b. 1946, German) in which one set of paper strips are folded into triangular prisms (the units or modules) and a second set of strips are folded into snaps (connectors).

Heinz Strobl, *Sphere 94*, 2010, Hydrofix paper tape

Tato: folded paper purses.

Tsutsumi: The tradition of paper gift-wrapping. It may have begun among the courtiers of the Heian period, but an 18th-century Japanese book about ceremonial paper folding

called Tsutsumi-no Ki explains that this tradition was established in the Muromachi period (1333-1574), when the samurai class was ruling Japan from Kyoto. According to this text, samurai etiquette required warriors to fold wrapping paper in a certain way depending on the gift inside, and this gift wrapping etiquette was passed down from generation to generation. At some point, these folded gift wrappers were adorned with noshi.

Wet folding: a technique that allows for the sculptural modeling of details, pioneered by Akira Yoshizawa.

Think Outside the Fold: Origami Applications

The realms of math, science, and art lie between the folds of contemporary origami masterpieces. Origami is not only used today to explain and teach arithmetic and geometry, but computational origami employs algorithms and theory to solve complex problems. Airbag logistics, space telescope lenses, cell phone design, architectural design, and even heart stents have their basis in origami principles and all are displayed in this exhibition. Just think of the interdisciplinary teaching opportunities!

For example, Dr. Robert J. Lang is a scientist and mathematician who formerly worked with NASA's Jet Propulsion Laboratory at the California Institute of Technology. In 2000, Dr. Lang was approached by Lawrence Livermore National Laboratory to help develop their Eyeglass Telescope, which would be forty times larger than the Hubble telescope. Dr. Lang used computational origami to determine how to fold the lens so that it could be launched compactly and then re-opened in space. The resulting design used an origami structure he called the "Umbrella" after its resemblance in the furled state to a collapsible umbrella. Origami is an international fine art form that is also at the cutting edge of math, science, and design. The creative possibilities and practical applications of this art form are truly infinite.

Additional Resources

Books about Sadako Sasaki:

By Eleanor Coerr

Sadako and the Thousand Paper Cranes, Yearling Books, 1986; Puffin Books, 2004

By Takayuki Ishii

One Thousand Paper Cranes: The Story of Sadako and the Children's Peace Statue, Laurel Leaf, 2005

Books about Origami, Mathematics, Science, and Technology:

By Erik D. Demaine and Joseph O'Rourke

Geometric Folding Algorithms: Linkages, Origami, Polyhedra, Cambridge, 2007

By Thomas Hull

Origami3: Third International Meeting of Origami, Science, Mathematics and Education, Boca Raton/London/New York: CRC Press, 2002

Project Origami, Boca Raton/London/New York: A K Peters Ltd., 2006

By Robert J. Lang

Origami4: Fourth International Meeting of Origami, Science, Mathematics and Education, Boca Raton/London/New York: CRC Press, 2009

By Patsy Wang-Iverson, Robert J. Lang and Mark Yim

Origami5: Fifth International Meeting of Origami, Science, Mathematics and Education, Boca Raton/London/New York: CRC Press, 2011

Beginning Origami Guides:

By Nick Robinson

Absolute Beginner's Origami, New York: Potter Craft, 2006

World's Best Origami, Alpha, 2010

The Origami Bible (with David Brill), North Light Books, 2004

Online Resources:

New York Times Origami Artist Review (An excellent survey of contemporary origami artists featured in *Folding Paper*.)

<http://query.nytimes.com/gst/fullpage.html?res=9400E6D81E30F936A15751C1A9629C8B63>

OrigamiUSA

OrigamiUSA is a national organization based in New York City. The website includes a calendar of origami events around the world and links to local and international origami societies.

<http://origamiusa.org/>

British Origami Society

This organization's website features *The Lister List*, a collection of scholarly articles about origami by British origami historian, David Lister.

<http://britishorigami.info/>

Japan Origami Academic Society

Publisher of *Origami Tanteidan Magazine*, this group is one of two origami societies in Japan.

<http://origami.gr.jp>

Nippon Origami Association

The Nippon Origami Association is the other major origami association in Japan.

<http://origami-noa.com/>

Origami Database

An online database of over 40,000 entries, showing where models are diagrammed, which models are included in various books, pictures of folded models, and links to many origami websites.

<http://origamidatabase.com/>

Origami Resource Center

A curated reference that provides information about the art of paper folding, links to diagrams, databases, book reviews, and ways to be a part of the paper-folding community.

<http://www.origami-resource-center.com/>

Documentary/DVD: (On view at the Woodson)

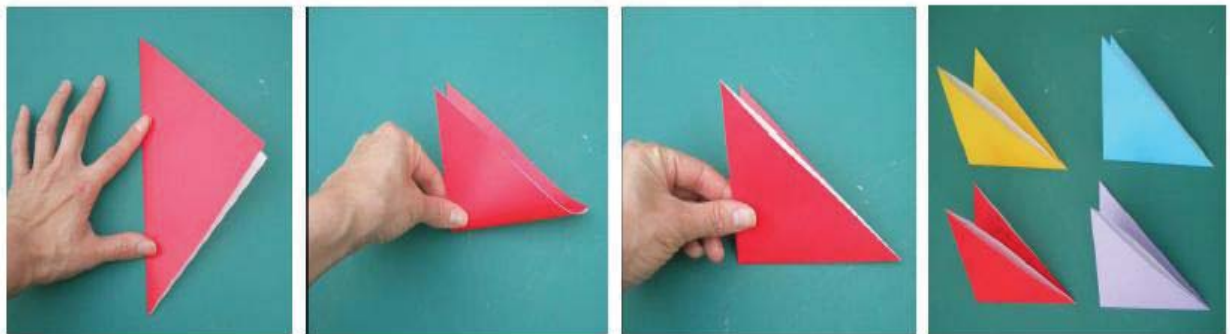
Directed by Vanessa Gould

- *Between the Folds*, Green Fuse Films, NYC, 2010 (available through

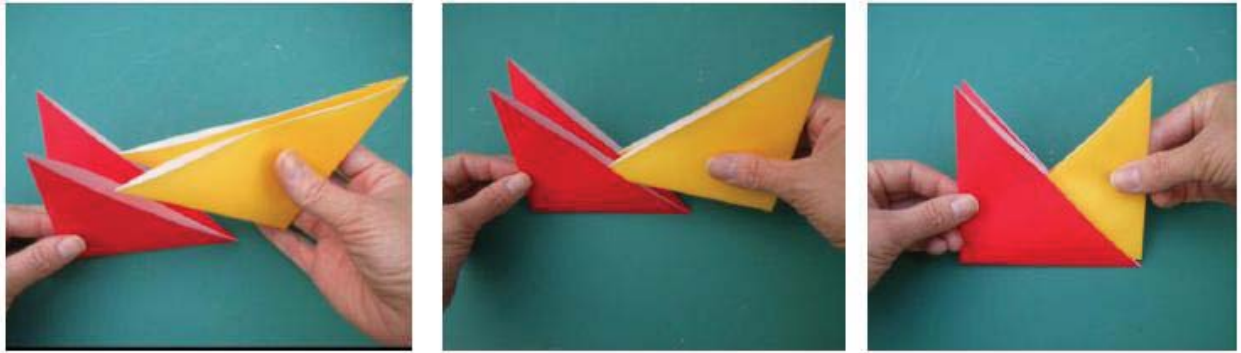
<http://www.PBS.org>)

Before Your Visit

- **Invite students to try some basic origami folds**
 - **The Coaster:** Modular origami is multiple pieces of paper folded in the same way and joined together repetitively to make two-or three-dimensional units without glue or tape.



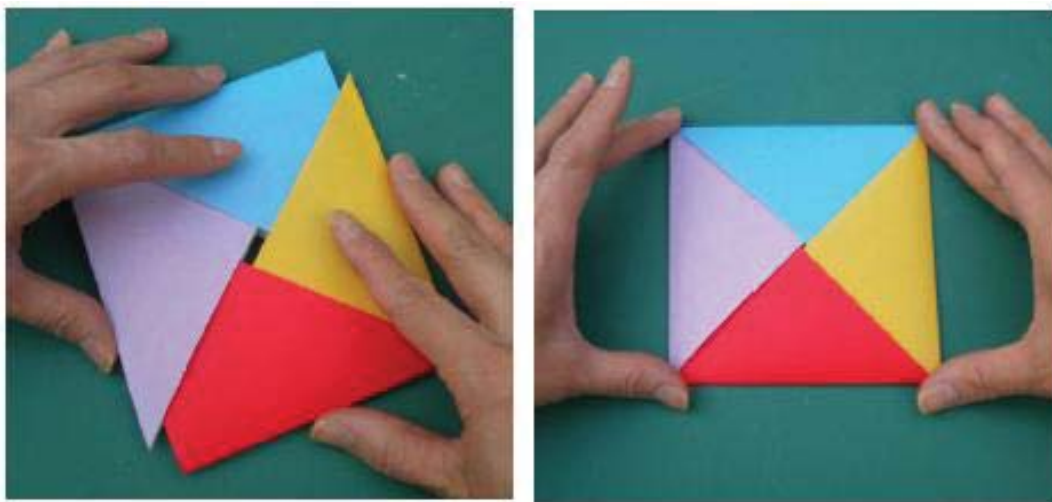
1. To make a unit for your coaster, fold a square sheet of paper in half on the diagonal and crease. Fold this in half once more so you have a right angle.
2. Repeat this until you have four sheets of paper all folded the same way.
3. Insert the two points of one unit into the two pockets of a second unit as shown.



4. Repeat this by inserting the points of the second unit into a third unit.
5. Repeat once again by inserting the points of the third unit into fourth unit.
6. Insert the two points of the fourth unit into the first unit.

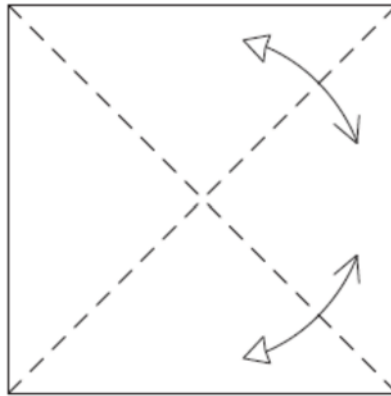


7. Squeeze all four pieces together so they are tight and make a coaster.

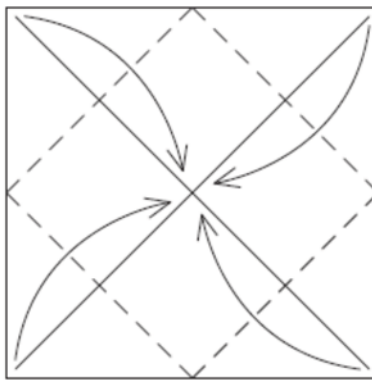


○ **The Origami Fortune Teller**

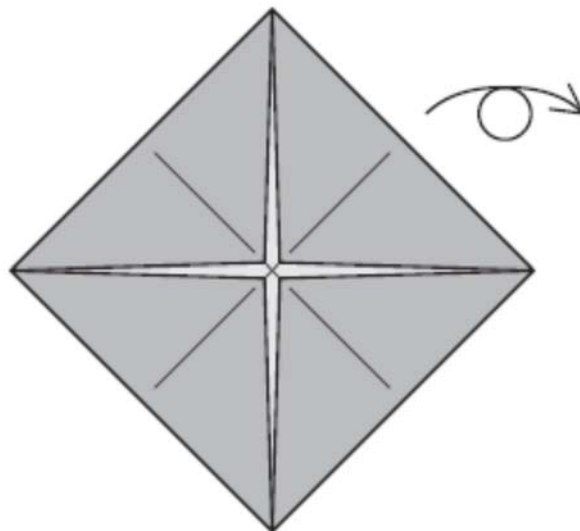
1. Begin with the plain side up. Fold the paper in half along each diagonal and unfold.



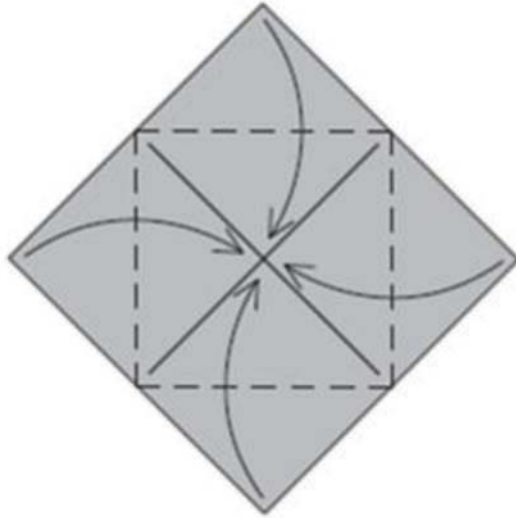
2. Fold the four corners in to the center of the square.



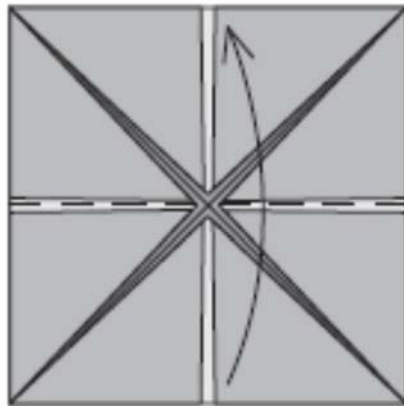
3. Turn the paper over.



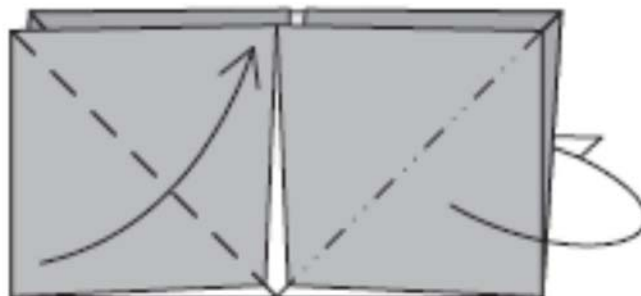
4. Fold the four corners in to the center again.



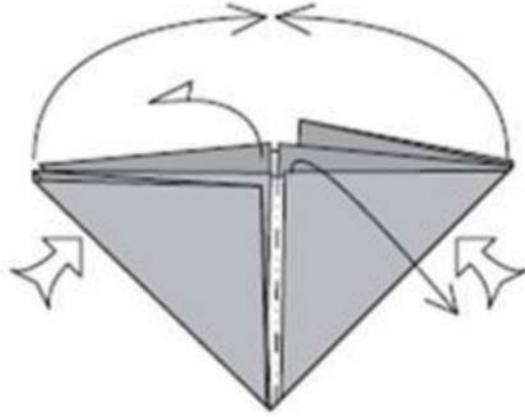
5. Fold the bottom edge up to meet the top edge.



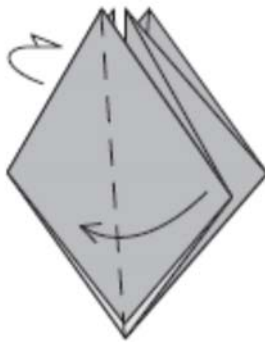
6. Fold the lower left corner up in front. Fold the lower right corner behind.



7. Open out the large pocket in the center top and squeeze the sides toward each other.

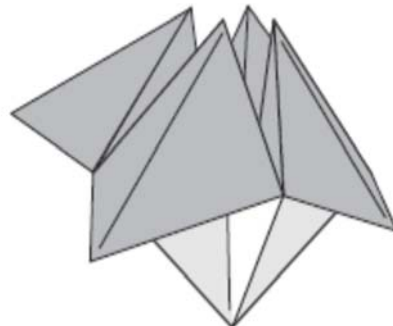
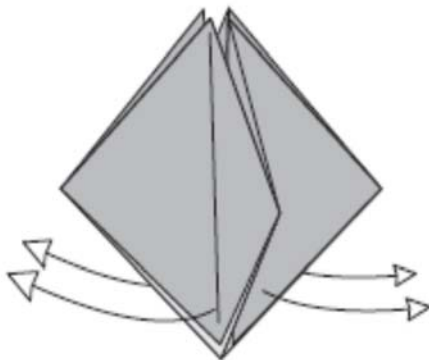


8. Adjust the position of the four flaps so that they all stand straight out from each other.



9. Pull out the four colored flaps.

10. Now you have a finished fortune teller.



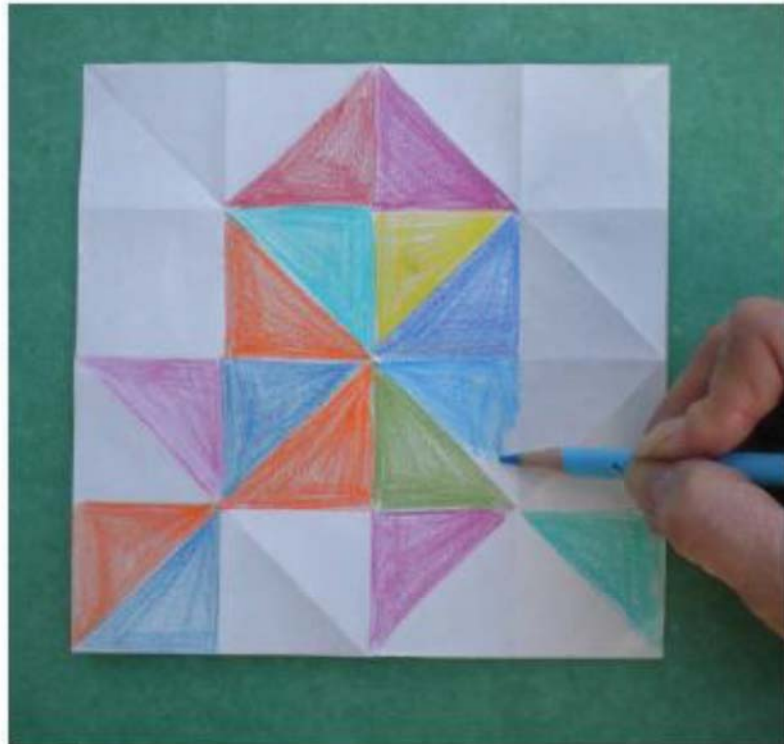
- **Crease Patterns & Origami Math**

Crease patterns are a map of the major folds in an origami design. Sometimes these patterns are just as interesting as what is made by folding paper!

- First, you'll need to make some creases:
 - Start by making an origami fortune teller by following the instructions provided.
 - Next, unfold the fortune teller.

Now that you have crease patterns, here are two different activities you can do.

- Make a work of art by coloring in the geometric shapes that have been created by the creases. How many triangles can you find? How many squares?



- Don't feel like coloring? Try testing this simple and fun math law called Euler's Theorem, where $x=1$:

$$V - E + F = 1$$
- How many points are there where lines come together? These are called vertices. This number is "V."
- How many edges (line segments) are there? This number is "E."
- How many faces (polygons) are there? This number is "F."

$V - E + F$ should equal the number 1. Did it work?

@ the Woodson

During your visit to the Woodson Art Museum, a docent will lead your group through the galleries offering insights and encouraging thoughtful dialogue inspired by the artworks. Students visiting the Museum will have an opportunity to create their own origami penguin, following the basic folding pattern inspired by Florence Temko's work in the exhibition (pictured at left).



Activity Guides

Each student receives an Activity Guide to extend learning in the classroom and at home. When students leave the Museum with an Activity Guide in hand, they are able to share their Museum visit with friends and family outside the gallery walls, along with their newfound expertise and enthusiasm.

Woodson Art Museum Information

Please encourage your students to visit the Museum with their families and share what they've learned. Admission is ALWAYS FREE! The Museum is open 9 am – 4 pm, Tuesday – Friday, and Noon – 5 pm on Saturday and Sunday. On the first Thursday of each month the Museum stays open until 7:30 pm for Night Out @ the

Woodson, featuring hands-on art for all ages. Call the Museum or visit the website for more information:

Woodson Art Museum

700 N. 12th St.

Wausau, WI 54403

www.lywam.org

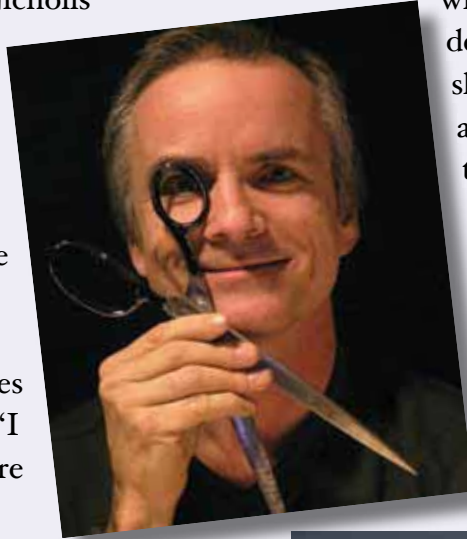
715.845.7010

Paper Cuts

Calvin Nicholls in Residence

Tuesday – Saturday, March 5 – 9

Canadian artist Calvin Nicholls' eye-popping, three-dimensional paper sculptures begin with careful study of an animal's musculoskeletal features. Once he determines the animal's body shape and underlying structure, Nicholls uses scalpels and leather-working tools to slice heavy paper into pieces that he shapes and glues together. "I developed my art to the point where I blended many of my passions –



wildlife, the natural world, photography, design, model making, sculpture, light and shadow and have managed to indulge in all of them," Nicholls said of his career that's spanned more than two decades.

During his five-day residency, Nicholls leads programs for school children during Museum visits, a workshop for all ages, a program for individuals with blindness or low vision, and a gallery walk.

March 7 Thursday 5:30 – 7 pm

Art History 101/Hands-on Art Sculpting Paper

Calvin Nicholls shares his techniques and process for creating striking three-dimensional paper sculptures of animals and leads participants in fashioning their own paper creations.

March 9 Saturday 10:30 am – Noon

Art Beyond Sight

Individuals with blindness or low vision hear Calvin Nicholls speak about creating his paper sculpture and experience his artwork by feeling the texture and detail of the artist's intricate work. ☎

March 9 Saturday 1 – 2 pm

Nicholls Gallery Walk

Accompany the artist on a walk through *Paper Sculpture by Design* and learn about the process and materials he uses to create his detailed depictions of animals.



Calvin Nicholls, *Lynx*, 2004, paper sculpture.

"Paper Cuts" funding comes from a Community Arts Grant from the Community Foundation of North Central Wisconsin, with funds from the Wisconsin Arts Board, Community Foundation, and the B.A. & Esther Greenheck Foundation. This project also is supported in part by a Challenge America Grant from the National Endowment for the Arts and a grant from Target.

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