

PRE-VISIT ART PACK & CURRICULUM GUIDE

ORIGAMI



Tom Hull, *Spiked Rhombic Enneacontahedron*, 2005
One hundred eighty 4-inch squares of Japanese artisan paper
Photo © Nancy Marshall

Students analyze the mathematical and scientific applications of origami in the exhibition *Folding Paper: The Infinite Possibilities of Origami*. In the studios, students transform a single piece of paper into a folded work of art.

CONNECTS TO

- Critical Thinking
- Math
- Patterns
- Problem-solving
- Science and Technology

BAM's SCHOOL TOUR PROGRAM GOALS

- Students will actively participate in the experience discussing the artwork, using art vocabulary and making meaningful, personal connections. Discussions will be associated with the information in the Pre-Visit Art Pack.
- Students will experience a studio activity that reinforces the concepts and/or techniques discussed/viewed in the galleries resulting in a tangible, personally meaningful understanding of the artwork.
- Students will leave the museum knowing that it is a fun, enjoyable place to learn. The Docents will help them understand that they do not need an art authority to tell them how to enjoy and what to appreciate about art.

The Boise Art Museum's education philosophy encourages the examination and discussion of the visual arts through a holistic approach to art education. Programs support the development of critical thinking skills, visual analysis, exploration and understanding of art techniques as well as the investigation of cultural contexts, art as a form of communication, and multidisciplinary connections. In its touring program, BAM uses arts-based, student-centered, guided-discovery techniques and inquiry strategies that encourage teaching directly from the object and encompass aspects of many education philosophies.

TOUR CHECKLIST FOR TEACHERS

Please follow the checklist below in preparation for your tour

BEFORE YOUR TOUR

WITH YOUR STUDENTS:

- DO THE PRE-VISIT ART TALK and review the VOCABULARY words with your students
- SHARE THE MUSEUM MANNERS with your students.
- MAKE LARGE NAMETAGS for students with their first names only.

WITH YOUR CHAPERONS:

- DESIGNATE YOUR ADULT CHAPERONS. A maximum of **four chaperons are admitted with the group for free.** Chaperons have specific responsibilities and are admitted with the students free of charge. Additional adults pay regular admission and are considered regular visitors in the Museum. (The teacher is counted as one of the four chaperons.)
- ASK CHAPERONS not to bring infants, younger children, or other siblings.
- REVIEW THE CHAPERON GUIDELINES with your designated chaperons.
- PRINT THE CHAPERON PASSES and HAVE YOUR PAYMENT PREPARED for any additional adults. Checks can be made payable to the Boise Art Museum or BAM. We are unable to make change, so please have the exact amount prepared if you are paying with cash. (Often teachers split the admission among all adults to cover the cost. Schools or individuals may pay for the additional adults.) **General admission is \$6; admission for seniors (62+) \$4, and full-time college students is \$3.**
- PREVIEW THE EXHIBITION with the *Free Teacher Preview Pass* included with your confirmation letter.

A NOTE TO HELP WITH CHAPERON SELECTION: All students will receive *Free Return Tickets* at the end of the visit. These tickets allow the student and one guest, to return and visit the Museum for free at a later date. Parents who indicate that they would like to be chaperons after you have designated the maximum limit of four (4) should be encouraged to return with their student at a later date using the *Free Return Ticket*.

WHEN YOU ARRIVE

- ARRIVE AT THE REAR EDUCATION ENTRANCE facing Julia Davis Park and the Rose Garden. Do not enter through the front of the museum. Arrive no more than 5 minutes before your scheduled time, as your docents can only let you into the Museum at your indicated tour time. Do not ring the delivery buzzer.
- DIVIDE YOUR CLASS INTO TWO GROUPS (of approximately 15 students) for their tour.
- IDENTIFY YOUR CHAPERONS for the docent and MAKE THE PAYMENT for additional adults
- LEAVE LARGE FIRST AID KITS AND BAGS at the Education Entrance. First aid kits and bags must be smaller than 11" X 15" and must be worn on the front of your body. BAM has multiple first aid kits on site.
- REMEMBER: The Museum has no indoor or outdoor lunch facilities. Tour groups may bring their lunches and enjoy Julia Davis Park or visit the restaurants at BODO or nearby Boise State University.

AFTER YOUR TOUR

- FILL OUT THE EVALUATION CARD that you receive from your tour guides. Your constructive criticism helps us continue to tailor our programs to suit your needs.
- DO THE MAKE IT! ACTIVITY or use related ideas listed in CURRICULAR CONNECTIONS to connect the tour to your classroom curricula.

INFORMATION FOR STUDENTS AND CHAPERONS

ORIGAMI

MUSEUM MANNERS FOR STUDENTS

Please share and discuss these MUSEUM MANNERS with your students.

Remembering to follow these manners on your tour at the Boise Art Museum will help keep the artwork safe and make sure everyone has a good experience on the tour.

- **Empty your mouth.** Food, drink, and gum are not allowed in the museum galleries.
 - **Stay at least 12” away** from the artwork and the walls.
 - **Keep your voices down** while discussing the artwork.
 - **Sit on the floor** during group discussions so everyone can see.
 - **Use indoor behavior**, running and jumping should be left for outdoors.
 - **Leave pens, markers and other writing/art materials at school**, in your backpack or on the bus.
 - **Pay attention and be a tour guide later.** At the end of the tour, your docent will give your teacher *Free Return Tickets* for each student. These tickets allow you and one guest to return and visit the Museum for free. When you return, you can take your guests on a tour using what you learned.
 - **Have fun** and enjoy your visit to the Boise Art Museum.
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CHAPERON GUIDELINES

Please share and discuss this information with your chaperons.

Agreeing to be a chaperon for the Boise Art Museum’s School Tour Program means that you understand the following policies and agree to participate when asked by the docent.

- **Chaperons should not bring infants, younger children, or siblings** with them on the tour.
- Keep students with the group and encouraging students to **stay at least 12” away from the artwork and walls.**
- Make sure students **sit (not lay) on the floor, keep their hands and feet to themselves** and stay at least 12” away from the walls and artwork.
- Help students to **pay attention and participate** by staying engaged with the group and the tour.
- **Encourage student participation.** If you feel you have a relevant response to the docent’s questions, please share, but allow your comment to complement the students’ ideas.
- The docent may call on you to **help during the studio project.** Pay attention to the instructions and help all students with the process.
- **Additional adults pay regular admission** and are considered independent visitors apart from the school tour. Additional adults are not required to participate in chaperon responsibilities.
- **Cameras, large purses, backpacks, coats and umbrellas should be left on the bus** or stored by the back exit until the end of the visit.
- **Turn your cell phone off.** The use of cell phones is not permitted in the Museum galleries.

CHAPERON PASSES

BAM offers FREE admission to four (4) adult chaperons with every pre-scheduled tour group. Additional adults must pay regular admission and are considered independent visitors to the Museum. **PLEASE PRINT THIS PAGE BEFORE ARRIVING AT BAM FOR YOUR TOUR.** Designate your four chaperons and have your payment prepared. When you arrive at BAM, please identify your four designated chaperons for the docents. Chaperons must agree to help supervise groups, follow the Museum Manners and participate in the tour activities when asked.

TOUR CHAPERON 1 _____ (TEACHER)

The Boise Art Museum's School Tour Program provides FREE admission to 4 adult chaperons with every group of students. Accepting the responsibilities of being a tour chaperon means that you understand and agree to do the following:

- Accompany their groups at all times while they are touring the Museum.
- Help the docent keep students with the group and at least 12" away from the artwork and walls.
- Assist the students and continue to supervise while in the studios.

Please do not bring infants, siblings or younger children with you as this diverts your attention from the group.

THANK YOU for helping make BAM's School Tour Program safe and enjoyable for everyone.

This chaperon pass is only valid during a pre-scheduled school tour. Duplicates are not accepted. BAM | BOISE ART MUSEUM

TOUR CHAPERON 2 _____ (NAME)

The Boise Art Museum's School Tour Program provides FREE admission to 4 adult chaperons with every group of students. Accepting the responsibilities of being a tour chaperon means that you understand and agree to do the following:

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TOUR CHAPERON 3 _____ (NAME)

The Boise Art Museum's School Tour Program provides FREE admission to 4 adult chaperons with every group of students. Accepting the responsibilities of being a tour chaperon means that you understand and agree to do the following:

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TOUR CHAPERON 4 _____ (NAME)

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- Assist the students and continue to supervise while in the studios.

Please do not bring infants, siblings or younger children with you as this diverts your attention from the group.

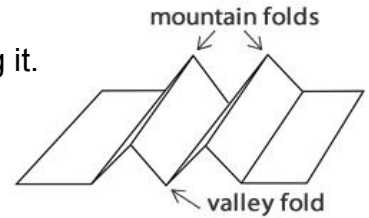
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VOCABULARY AND OBJECTIVES

ORIGAMI

Fold A line or crease produced in a material as the result of bending it. All origami folding comes from two basic types of folds—the mountain fold and the valley fold. (See illustration)



Geometry A branch of mathematics that deals with points, lines, angles, surfaces, and solids.

Medium The material that artists use to create their art. One work of art could be made of one medium or several media.

Media Media is the plural of medium.

Origami The art of folding paper. It comes from the Japanese word “ori” which means “to fold” and “kami” which means paper.

Pattern A repeated form, shape, or design often used to decorate something.

IN THIS TOUR STUDENTS WILL

- Compare and contrast origami artwork and discuss different ways in which artists create origami.
- Explore the application of origami to mathematic and scientific principles.
- Participate in gallery activities that help students understand the origins of origami and see a variety of everyday origami applications.
- Apply what they have learned in the galleries to transform a single sheet of paper into a folded work of art.

ABOUT THE EXHIBIT

Folding Paper: The Infinite Possibilities of Origami was developed by Meher McArthur, the former curator of East Asian Art at the Pacific Asia Museum in Pasadena. McArthur enlisted the help of artist and physicist Dr. Robert J. Lang who served as exhibition advisor. Lang is not only one of the world’s leading masters of paper folding, but he is also recognized for his integration of origami with math and science. With the partnership of the Japanese American National Museum, International Arts & Artists, a nonprofit art service organization, then developed *Folding Paper* for tour.

Folding Paper includes the work of 46 different origami artists, representing 16 different countries. This exhibit highlights how origami has evolved from merely a pastime for children and dexterous adults to fine art. *Folding Paper* features the work of Origami artists like Akira Yoshizawa, Eric Joisel, Linda Tomoko Mihara, Bernie Peyton, and Robert Lang. Additionally, it demonstrates how principles of Origami have numerous modern applications which have revolutionized design, mathematics, and engineering alike. Stunning examples in the form of gowns, tables, and even nanoinjectors take their place alongside these works of art made of paper.

PRE-VISIT ACTIVITY: ART TALK

ORIGAMI

Please view the two reproductions (Pre-Tour Images) with your class and lead a discussion using the following questions as guidelines. There are no “right” answers. The questions are meant to guide the group discussion. Students will revisit and discuss the original works at BAM. The vocabulary in this packet will aid discussion.

Research and experience have shown that students feel more comfortable when they can connect with something familiar once they arrive at the Museum. The students are excited to find “their” works of art while they are at BAM. They enjoy sharing their insights from the classroom discussion with the docent and making valuable comparisons between the textbook-like reproductions and the original works of art.

Robert J. Lang

Spring Red-Tailed Hawk, opus 601, 2010

One uncut square of Korean *hanji* paper

Support and base: paper, wire, and paint

Photo © Robert J. Lang

- What do you find most interesting about this work of art?

This work is titled *Red-Tailed Hawk, opus 601*. It is made from folded paper. Origami is the term used to describe artwork made by folding paper.

- What are some things besides paper that you can fold? (Clothes, legs, fingers, etc.)
- What are things you use paper for? (Homework, wrapping a present, wiping up a spill, etc.)

Red-Tailed Hawk was created by artist and physicist Robert Lang. He folded this hawk from one single sheet of paper. This is considered traditional origami, where artists use only one sheet of paper— no cuts, no glue.

- Why do you think an artist would want to use only one piece of paper?
- Have you ever made origami before? What did you make? Was it difficult or easy? Why?

Tom Hull

Spiked Rhombic Enneacotahedron, 2005

One hundred eighty 4-inch squares of Japanese artisan paper

Photo © Nancy Marshall

- What shapes do you see in this work of art? Colors?
- Does the artwork remind you of anything?
- How is this work of origami different than the previous one we discussed?

This artwork is also made from folded paper. However, it is made from many sheets of paper that are folded together to create a larger form. In fact, Tom Hull, the artist, used one hundred eighty sheets of square paper to make it.

- Why do you think this artist wanted to use more than one sheet of paper?

Many artists use complex math and equations to create origami. Tom Hull used mathematical principles to help him make models of geometric forms.

- Why do you think the artist wanted to use paper to build a geometric form rather than drawing it?

The two images may also be accessed through our website, www.boiseartmuseum.org under Learn – School Programs – School Tours – Pre-Visit Art Packs – Origami

PRE-VISIT IMAGE

ORIGAMI



Robert J. Lang
Soaring Red-Tailed Hawk, opus 601, 2010
One uncut square of Korean *hanggi* paper
Photo © Robert J. Lang

The two images may also be accessed through our website, www.boiseartmuseum.org under Learn – School Programs – School Tours – Pre-Visit Art Packs – [Origami](#)

PRE-VISIT IMAGE

ORIGAMI



Tom Hull

Spiked Rhombic Enneacontahedron, 2005

One hundred eighty 4-inch squares of Japanese artisan paper

Photo © Nancy Marshall

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CURRICULUM CONNECTIONS

ORIGAMI

Social Studies / History / Geography:

- Paper cranes have become a worldwide symbol of peace due to the story of Sadako Sasaki. Study the history of the crane and its beginnings with Sasaki. Have students then research and present examples in which people used the crane to symbolize peace and global unity. Finally, have students write something that they can do to promote peace on a paper square and fold it into a crane. Hang them in the classroom to create a peace sculpture. For a video tutorial on how to make a crane visit: <https://www.youtube.com/watch?v=es-vMeZy9HA>.
- Origami's foundation is closely tied to Japan. Have students research Japan and aspects of its geography, traditions, and culture. Students can then pick one thing they learned about Japan and present their selection using cultural objects, artwork, or food. A good resource for younger ages is: *Japanese Traditions: Rice Cakes, Cherry Blossoms and Matsuri, A Year of Seasonal Japanese Festivities* by Setsu Broderick.
- For centuries cultures have debated what is considered fine art. Origami was traditionally thought of as a pastime for children rather than an art form. However, in the mid-20th century, the art of folding paper started to be seen as art rather than craft. Have students brainstorm examples of what they consider art and craft. Then split students into two groups and designate one side to defend origami as an art form and the other side to argue it is as a craft.

Language Arts:

- Have students learn to write Haikus, a traditional form of Japanese poetry. Haikus consist of only 3 lines. The first and third line are 5 syllables, while the middle line is 7, creating the pattern 5, 7, 5.
- Have students use origami to illustrate a story. They can begin with either the text or the origami form. Photograph the forms in different arrangements to illustrate the story then compile the text and photographs to complete the project.
- Have students practice writing for a newspaper. First, have student interview each other about something they make. Then have students practice taking an interview and converting it into an article. Finally, compile the articles into a small class newspaper.

Science:

- Scientific principles can be illustrated using origami. View this video: <https://www.youtube.com/watch?v=qrGnyE5yXLE>, and have students make a simple turbine by folding paper.
- Have students conduct their own experiment with folding paper planes. Give students different weights and textures of paper. Have students hypothesize about the performance of each airplane. For example, one type of paper could help the plane fly furthest, while another could help it stay in flight longest. Then have students carry out a series of trials, keeping of record of each attempt to see how correct their hypotheses were.

CURRICULUM CONNECTIONS

ORIGAMI

Math:

- Teach students how folding and other origami principles allow 2-D shapes to transform into 3-D shapes. Then have students practice by taking a sheet of paper and folding it into something 3-dimensional. This website has easy tutorials to follow: <http://www.origami-fun.com/origami-instructions.html>.
- Have students fold and unfold a single sheet of paper in several different places. With a protractor, let them measure one of the angles created by one of their folds. Then have the students continue to find the rest of the angles without any help from their protractor. To extend the project, have students calculate and fold the largest equilateral triangle they can out of the given sheet of paper. For more details on this concept and many more ideas about incorporating origami into math, consult Thomas Hull's *Project Origami: Activities for Exploring Mathematics, Second Edition*.

Technology:

- Origami has been used to revolutionize space equipment, heart stents, and even airbags. In these examples, origami principles were used to fold something large fold into a small space. Have students research technology that has been influenced by origami. Then have students find something they use every day that folding could enhance. Have them reinvent this item with origami principles and draw the plans necessary to implement their new creation.
- Whether it is the clothes we wear or the map we use on a hike, principles of folding are all around us. Have students plan to observe and record all the things they can find that fold for an entire week. Before they start, estimate as a class how many different things students think they will find as a class. After observing for a week, compile the observations and see how long you can make the list. Compare the actual list to the original estimate.
- Have students make a tutorial on how to make an origami object. Either give them written instructions and have them film a tutorial with explanations, or have them watch a film tutorial and work in reverse, taking pictures and laying out images and text for a computer generated handout.

Arts:

- Folding has been implemented into many areas of design. Have students incorporate folding into a different medium other than paper. For example students could use principles of folding to pleat fabric into a sculpture or bend wire into a work of art.
- Minimalist origami seeks to utilize as few folds as possible. Have students practice minimal origami, by having them create a form with as few folds as possible.

WEBSITES

ORIGAMI

For Teachers

<http://www.langorigami.com/glossary/glossary.php> —In depth glossary of origami terms.

<https://origamiusa.org/> —Website with ways to order paper, instructions for folding, and origami magazines to read.

http://www.markschenk.com/research/teaching/archeng2012/handouts_ArchEng2012_Origami.pdf—Article highlighting the many applications of origami.

<http://www.paperfolding.com/math/> — Resource for integrating math lessons and origami.

For Teachers and Students

<http://www.origami-fun.com/> — Website with folding instructions.

<http://www.origami-instructions.com/> — Comprehensive visual instructions for origami patterns.

<http://www.wikihow.com/Make-Origami> — Video tutorials of origami patterns.

http://www.ted.com/talks/robert_lang_folds_way_new_origami — Ted Talk by artist and contributor Robert Lang.

<http://architizer.com/blog/folding-architecture-top-10-origami-inspired-buildings/> — Examples of origami inspired architecture.

<http://www.origami-resource-center.com/> —Information about paper folding, diagrams, databases, book reviews, and ways to become part of the paper folding community.

<http://origamidatabase.com/> —Database of over 40,000 entries, showing where models are diagrammed, which models are included in various books, and links for other Origami websites.

BIBLIOGRAPHY

ORIGAMI

Teachers

Erik D. Demaine and Joseph O'Rourke. *Geometric Folding Algorithms: Linkages, Origami, Polyhedra*, Cambridge. Cambridge University Press, July 16 2007. ISBN-13:0978-0521857574.

Thomas Hull. *Origami³: Third International Meeting of Origami, Science, Mathematics and Education Sponsored by Origami USA*. A K Peters/CRC Press, July 18, 2002. ISBN-13: 978-1568811819.

Robert J. Lang. *Origami⁴ Fourth International Meeting of Origami, Science, Mathematics and Education*. A K Petters/CRC Press, July 2009. ISBN-13: 978-1568813462.

Patsy Wnag-Iverson, Robert J. Lang, and Mark Yim. *Origami⁵: International Meeting of Origami, Science, Mathematics and Education*. A K Petters/CRC Press, July 2011. ISBN-13: 978-1568817149.

Pre-K to 3rd

Molly Bang. *The Paper Crane*. Greenwillow Books, July 15 1987. ISBN-13: 978-0688073336.

Kristine O'Connell George. *Fold Me a Poem*. HMH Books for Young Readers, April 1, 2005. ISBN-13: 978-0152025014.

Nathaniel Lachenmeyer. *The Origami Master*. Albert Whitman & Company, September 1, 2008. ISBN13:978-0807561348.

Mary Chloe Schoolcraft Saunders. *Spread Your Wings and Fly: An Origami Fold-and-Tell Story*. Bear Club Books, November 1, 2001. ISBN-13: 978-1879181755.

4th-6th

Eleanor Coerr. *Sdako and the Thousand Paper Cranes*. Puffin Books, April 12, 2004. ISBN-13: 978-0142401132.

JC Nolan. *Origami Kids: 32 Projects Designed by and for Kids*. CreateSpace Independent Publishing Platform, June 23, 2013. ISBN-13: 978-1484953150.

Michael G. LaFosse and Richard L. Alexander. *Story-gami Kit: Create Origami Using Folding Stories*. Tuttle Publishing, October 10, 2010. ISBN-13: 978-0804841344

Young Adult / Adult

Robert J. Lang. *Origami Design Secrets: Mathematical Methods for an Ancient Art*. A K Peters/CRC Press, October 5, 2011. ISBN-13: 978-1568814360.

Eric Gjerde. *Origami Tessellations: Awe-Inspiring Geometric Designs*. A K Peters/CRC Press, December 2008. ISBN-13: 978-15688.

Ekaterina Lukasheva. *Dover Kusudama Origami Book*. Dover Publications, February 20, 2014. ISBN-13: 978-0486499659.

Takeuiki Ishii. *One Thousand Paper Cranes: The Story of Sadako and the Children's Peace Statue*. Laurel Leaf, January 9, 2001. ISBN-13 978-0440228431

MAKE-IT ACTIVITY

ORIGAMI

To extend the museum experience and connect the tour to your curriculum, consider using or adapting this lesson plan suggestion

MARBLED PAPER

Introduction

In this Make-It! Activity, students will apply what they have learned about origami as a art form by creating their own origami form using paper they decorate themselves.

Materials

- Paper
- Foam shaving cream
- Liquid watercolor paint or diluted food coloring
- Liquid droppers
- Toothpicks
- Cardboard or scraping tool
- Scissors
- Origami instructions



Instructions

- Have students spread a thin layer of shaving cream (a little larger than the size of their paper) on a clean surface such as tray or plastic cutting board.
- Use the dropper to splatter the liquid watercolor paint onto the surface of the shaving cream.
- Gently swirl the colors with a toothpick to get a marbled effect. (Note: Too much mixing could muddy the colors.)
- Press a piece of paper gently into the surface of the colorful shaving cream.
- Lift the paper and carefully scrape off shaving cream with a piece of cardboard or craft stick. Let dry.
- Measure and cut an equilateral square from the finished paper.
- Fold the square into an origami creation. For examples of patterns visit: <http://www.origami-fun.com/origami-for-kids.html>

EXTENSION:

Paper Cutting Project

Have students design a pattern or draw a silhouette that will be cut out of the marbled paper. Trace the pattern or silhouette on the marbled paper. Have students cut out the pattern or silhouette and use the cut marbled paper to decorate a background of their choice. Students may cut out multiple shapes from their marbled paper to create their cut-paper artwork.