TEACHING BY DESIGN

FRANK LLOYD WRIGHT TRUST

FOLDING WITH FROEBEL: AN ORIGAMI LESSON

GRADE: 6-8
TIME: Two 45-minute sessions

Frank Lloyd Wright attributed his love of geometry to Froebel blocks, which his mother, Anna Lloyd Jones, gave to him as a child. Having attended teacher training, Anna facilitated Froebelian lessons at home to Wright. Friedrich Froebel, a prolific pedagogue and the inventor of Kindergarten, designed the Froebelian education system so that young learners could explore the geometric forms of nature and the world around them. In this lesson, students explore geometry by completing Froebelian paper folding exercises (origami). Students will compare their paper creations to Wright-designed art and architecture and will reflect on the similar geometries found in their own day-to-day lives.

INTEGRATED SUBJECTS: Visual Arts, Math

MATERIALS | RESOURCES

Large square Origami Paper, 1 sheet per student (8 inch or larger recommended)
2 different colored markers (or pen/ colored pencils)
Access to the internet for displaying videos/ images
Appendix A (Falten, pg. 40)
Appendix B (Images of Wright's designs)
Appendix C (Falten, pg. 41)

OBJECTIVES

1. Learn about Friedrich Froebel and his learning system, which included paper folding.
2. Create origami creations according to Friedrich Froebel's guide.
3. Understand that origami and geometry are interrelated by observing crease patterns.
4. Make connections between Wright's works of art/ architecture and Froebel's paper folding forms.

ESSENTIAL QUESTIONS

1. Who was Friedrich Froebel and why is he significant?
2. How are origami and geometry related?
3. How was Wright inspired by Friedrich Froebel's educational system?

LESSON PROCEDURE

EXPLORE

Session One

- Begin by asking students if they have ever tried making origami shapes.
- Gather student's attention by showing the TED-Ed video: "The satisfying math of folding origami" https://youtu.be/etCW9M9VdGk?si=wTkHRodMP65QH-iP

ENGAGE

Session One

- Introduce Friedrich Froebel and his love of nature and geometry. Explain that he invented Kindergarten and created a series of educational tools which taught children about geometric forms in their surrounding world. One of these tools was paper, and students were directed to arrange, weave, and fold paper.
- Froebel's paper folding instructions resemble the paper making art of origami. Paper was invented in China and was brought to Japan in the 600s. Evidence of Japanese paperfolding dates as far back as the 1600s. The word origami, meaning "fold paper" became popularized in the 1880s, around the time Froebel's gifts were used in classrooms internationally.[1]
  - The first Froebelian Kindergarten in Japan opened in 1876. By 1880, all graduating teachers at the Female Normal School were required to learn the Froebelian method. By 1911, there were 497 Froebelian Kindergartens in Japan, where 1,535 trained teachers reached 45,202 students.[2]

DESIGN

Session One

- Distribute a page of "Falten" (folds) from Froebel's 1874 guide[3] (pg. 40, Appendix A) to each student. Though Froebel died in 1852, this guide is well-regarded as close to Froebel's original goals. Provide each student with origami paper and direct students to recreate all the paper forms on the page, going in order of figures 1-12.

CRITIQUE & INTERPRET

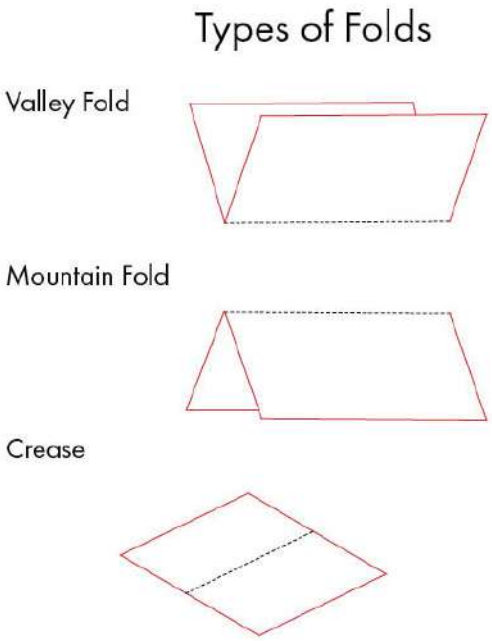
Session One

- After finishing all 12 paper figures of pg. 40, ask students to unfold their paper completely and observe the crease patterns created by their folding. A crease pattern is an unfolded completed origami design.
  - Optional: Display crease patterns of advanced origami designs on your screen for your students. https://langorigami.com/crease-patterns/
- Direct students to identify a valley fold and mountain fold on their paper. A **mountain fold** is a fold which is convex and bends the paper upward like a ridge. A **valley fold** is a fold which is concave and bends the paper downward like a valley.

1 Robinson, N. (2025, May 8). ***Origami***. Encyclopaedia Britannica. https://www.britannica.com/art/origami
2 Brosterman, N. (2014). ***Inventing kindergarten***. Kaleidograph Design LLC.
3 Goldammer, H., Marenholtz-Bülow, B. v. (1874). Der kindergarten: Handbuch der Fröbel'schen erzeihungsmethode, spielgaben und beschäftigungen. Germany: C.G. Lüderitz'sche verlagsbuchhandlung, C. Habel.

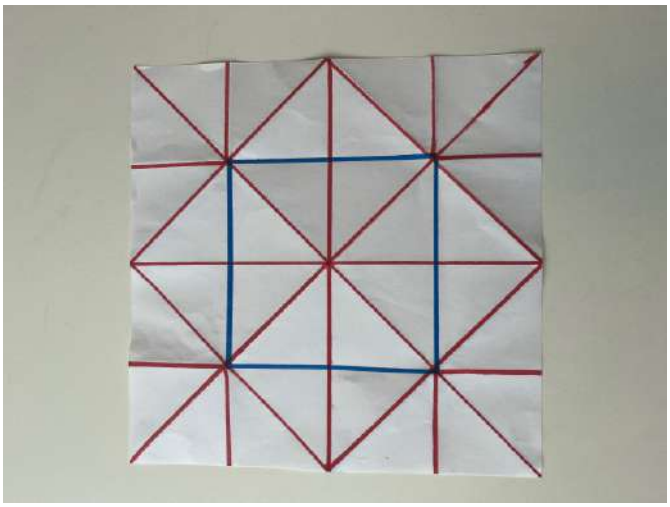
LESSON PROCEDURE *(continued)*

- Reference this diagram:

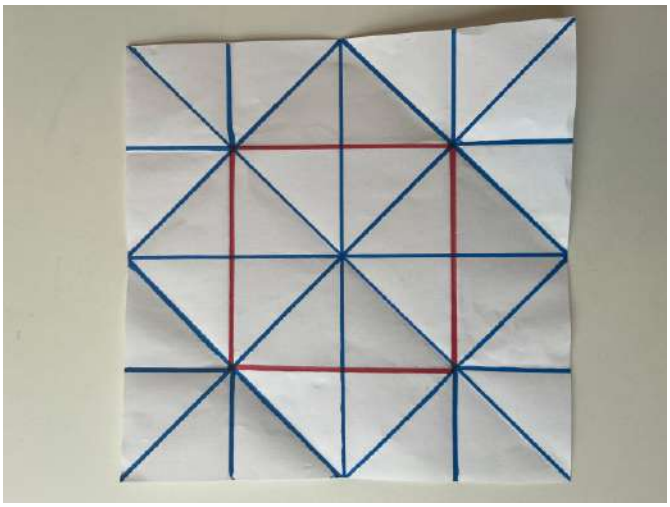


- Next, instruct students to use 2 different colored markers (or pen/colored pencils) to trace the lines in their design, using a different color for mountain folds and valley folds. Once students are done, instruct them to turn their paper over and trace the mountain and valley folds on the backside as well. Students may want to use a ruler for precise lines.
- Example:

Side 1



Side 2



- **Pose the following questions to students and discuss:** *Do you see more mountain folds or valley folds? What geometric shapes are formed by the creases? What kind of angles are formed in the crease pattern (right, acute, or obtuse)?*
- **Instruct students to refold their paper in the steps of pg. 40 until they've reached step 12 again. Ask students:** *How is your folding process reflected in the crease pattern? Does the crease pattern reveal any folds you made that aren't folded in the final design?*
- **Direct students to keep their folded paper from Session One because they will need it for Session Two.**

LESSON PROCEDURE *(continued)*

EXPLORE

Session Two

- Introduce Frank Lloyd Wright and his role as an architect. Explain to students that he was heavily influenced by geometry from a young age, and he attributed this interest to Froebel's educational systems. Wright's mother, Anna, taught Wright using these educational tools.

ENGAGE

Session Two

- Next, distribute images of Wright-designed buildings, floorplans, and furniture/fixtures (Appendix B).
  - Ask students how Wright may have been inspired by Froebel's paper folding forms and to write down similarities they notice, looking for similar shapes and angles to those that appeared in their folding work on Day 1.

DESIGN

Session Two

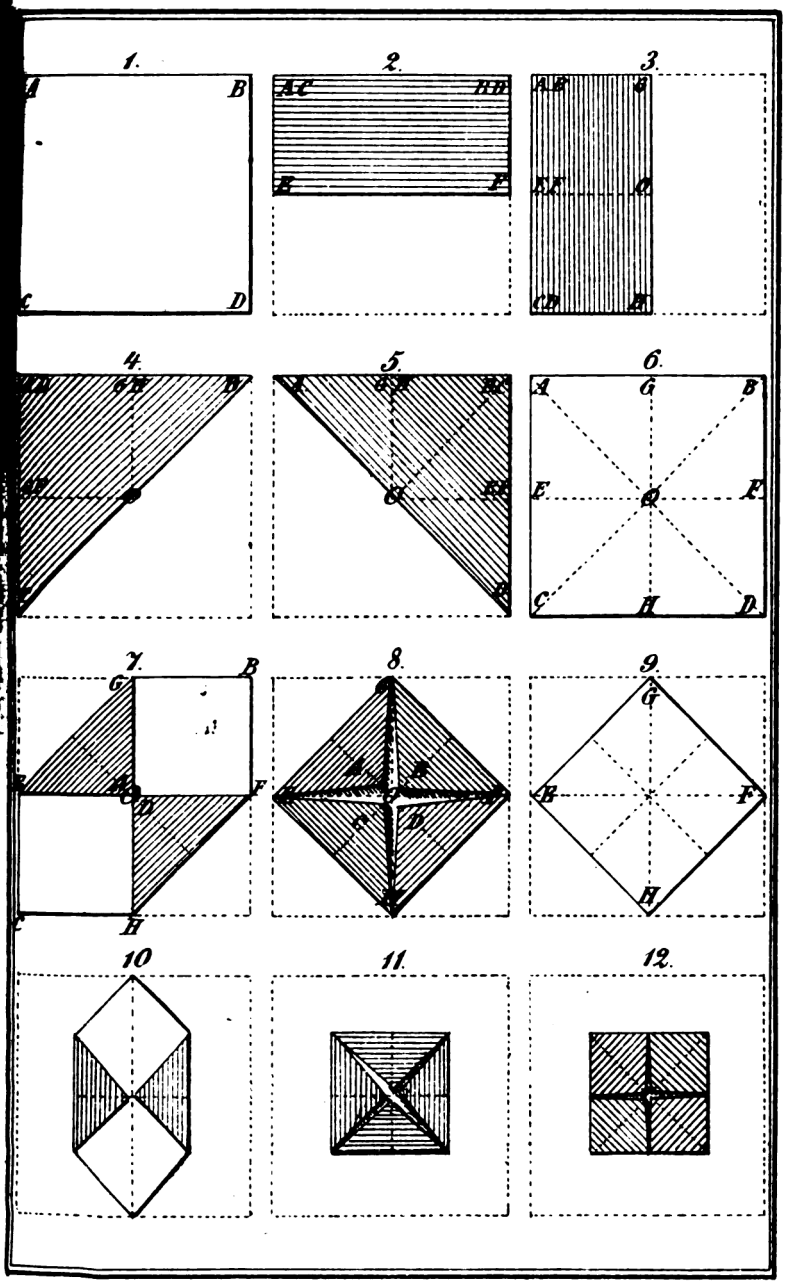
- Instruct students to get out their paper from Day 1. Distribute another sheet of Froebel's designs (pg. 41, Appendix C). *(Pg. 41 continues from Step 12 of pg. 40, so if students lose/unfold their paper from Day 1, they will first need to remake their designs on pg. 40 before getting started with pg. 41.)*
  - Direct students to make all forms on pg. 41, once again going in order of Steps1- 24. At Step 13, students will need to flip their paper over and fold it on the backside.
  - Let students know that these designs are challenging. Froebel's young students were expected to have adult assistance when creating the paper folds, so encourage students to be patient and learn to embrace the challenge.
  - Remind students not to skip any steps, because the creases of each form contribute to the next form, and thus the forms are interrelated.
  - Provide plenty of time for students to complete their designs. Each student will work at a different pace, but this will likely take the majority of the class session and may continue into a third session.

CRITIQUE & INTERPRET

Session Two

- Ask students to once again compare their paper folding forms to Wright's work. Encourage students to notice additional similarities they see between Froebel's paper folding forms and Wright's designs.
- Explain that Wright's love of Froebel's gifts and occupations continued throughout his entire life. Read a quote from "*A Testament,*" Frank Lloyd Wright's autobiography published in 1957, "*Also German papers, glazed and matte, beautiful soft color qualities, were another one of the 'gifts'.... I soon became susceptible to constructive pattern evolving in everything I saw. I learned to 'see' this way and when I did, I did not care to draw casual incidentals to Nature. I wanted to design.*" *A Testament*, pg. 20
- Ask students if their paper folding reminds them of geometric shapes found in nature or from their own home/life. Encourage students to make a list (while at school or as an independent assignment at home) and share their findings aloud. *Possible Answers include: Snowflakes, stars, flowers, sun rays (designs in nature), Tile patterns, window designs, light fixtures (designs at home).*
  - ◊ Optional Extension: During another session or as an independent assignment, direct students to pick a piece of furniture or design element from their home or school and try to recreate it using only paper. Allow students to use scissors to cut paper (kirigami) if desired or prohibit it for an added challenge. Encourage students to research existing origami designs to assist them as they make their paper creation. For more origami resources, visit the Oak Park Library's resources on its website.

Falten.



Images of Wright's designs

Robie House - Wall Sconce

Wright's Home and Studio - Library Skylight

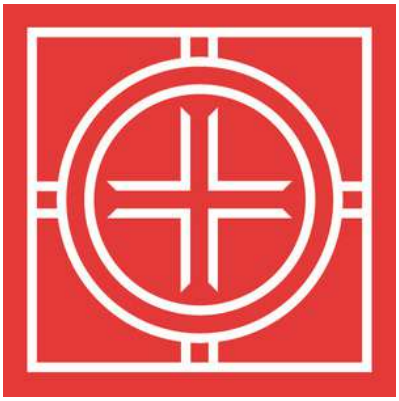
Wright's Home and Studio - Drafting Room Ceiling

Wright's Home and Studio - Playroom Light

Appendix B cont.

Unity Temple -
Light Fixture

Wright's Logo



Unity Temple -
Rooftop

Unity Temple -
Ceiling Skylight

Robie House -
Carpet Design

Falten.