

SYMMETRY IN NATURE

GRADE: 3-5

TIME: Five 60-minute sessions

Frank Lloyd Wright was known for creating art glass designs that incorporated simple shapes, lines, and patterns that appear in the natural world. In this lesson, students will practice identifying lines of symmetry in the work of Frank Lloyd Wright and, like the famous architect, will create symmetrical art glass designs inspired by nature.

INTEGRATED SUBJECTS: Visual Arts, Math, Social-Emotional Learning, Social Studies, Media Literacy

OBJECTIVES

MATERIALS | RESOURCES

Anchor text about Frank Lloyd Wright
Images of Wright's art glass designs
Handheld mirrors
Paper
Pencils
Colored pencils or crayons
A straight edge or ruler
Black glue
Watercolor paints
Natural material from the surrounding area,
such as leaves or flowers
Note catcher worksheet (included below)
Venn diagram worksheet (included below)
Symmetry worksheets (included below)
Planning worksheet (included below)

1. Explore and understand the life and work of architect Frank Lloyd Wright.
2. Identify architectural details and their connection to nature (biomimicry).
3. Design a symmetrical art glass window inspired by nature and direct observation.
4. Create an art glass window ready for display in a student's personal space.

ESSENTIAL QUESTIONS

1. How is geometry reflected in architecture and design?
2. How can an entire work of art or architecture be produced from many smaller parts?
3. How does a team effort allow for greater success?

LESSON PROCEDURE

EXPLORE

Session One

- Ask students to read an anchor text about Frank Lloyd Wright and record their comprehension by completing the “note catcher” activity included in this lesson plan. (Tip: For an anchor text, we recommend *Who was Frank Lloyd Wright* by Ellen Labrecque, illustrated by Ted Hammond.) Review text and discuss findings as a group.
- Introduce two famous examples of art glass and ask students to complete a Venn diagram that compares and contrasts the two works. (Venn diagram worksheet included in this lesson plan.)
- Challenge students to explore symmetry by completing the symmetrical designs featured in the symmetry activity included in this lesson plan. Afterwards, ask: Where do you see symmetry in the art glass designs of Frank Lloyd Wright? Challenge students to identify lines of symmetry as they explore examples of Wright’s work. Images can be found at <https://www.teachingbydesign.org/multimedia/>

ENGAGE

Session Two

- Explore the relationship between Wright’s art glass designs and nature by showing images of the art glass designs alongside similar forms in nature. Ask: Is there symmetry in nature? (For examples of nature-inspired art glass designs, visit <https://www.teachingbydesign.org/multimedia/>)
- Distribute square handheld mirrors and challenge students to observe symmetry inside and outside of the classroom by holding the mirrors up to various objects and natural materials. Reinforce that they might be seeing bilateral symmetry, or symmetry that is along one axis. Encourage students to draw their observations, and identify a few symmetrical objects from nature for further study.

DESIGN

Sessions Three and Four

- Inspired by their earlier sketches and observations of symmetry in nature, students use their sketches to create several nature-inspired art glass designs. As an aid, students can use the art glass planning worksheet that is included in this lesson plan.
- Reinforce the use of symmetry by asking students to demonstrate how to create mirrored images.
- Students will select one design to refine and reproduce at a larger scale.
- Students will execute their designs with watercolor paints. To simulate the leaded lines of the art glass, students can outline the design with black glue.

CRITIQUE & INTERPRET

Session Five

- Create a gallery walk of student work in your classroom so students can showcase and share their work.
- Ask students to share a positive comment on art glass examples other than their own. If the walk is done independently, ask students to share positive comments on post-it notes.
- If time allows, consider using student-to-student peer feedback to repeat Sessions 3 and 4 with students, resulting in multiple drafts.
- Ask students to write a short paragraph reflecting on this prompt: Collectively, what are we doing well?



FRANK
LLOYD
WRIGHT
TRUST

NOTE CATCHER

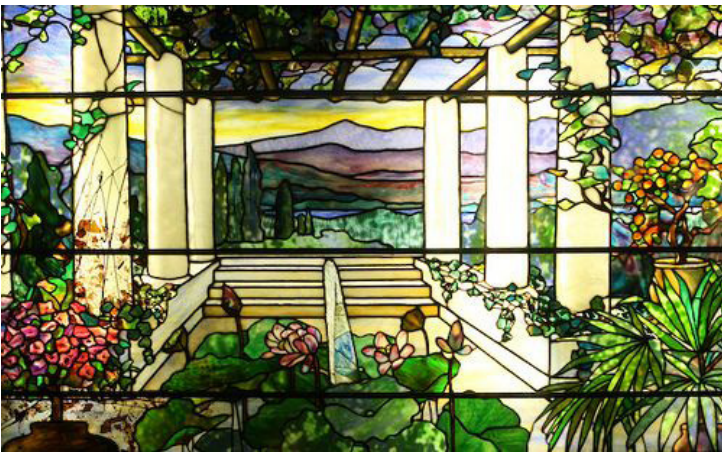
What I *know* about Frank
Lloyd Wright...

What I *learned* about Frank
Lloyd Wright...

REFLECT

Take a close look at the two art glass examples below. What do you see? Both designs were completed in 1910. One was designed by Tiffany Studios and one was designed by Frank Lloyd Wright. List at least **three differences** and **three similarities** that you see. (Tip: List similarities in the part of the diagram where the circles intersect. List differences in the outer parts of each circle.)

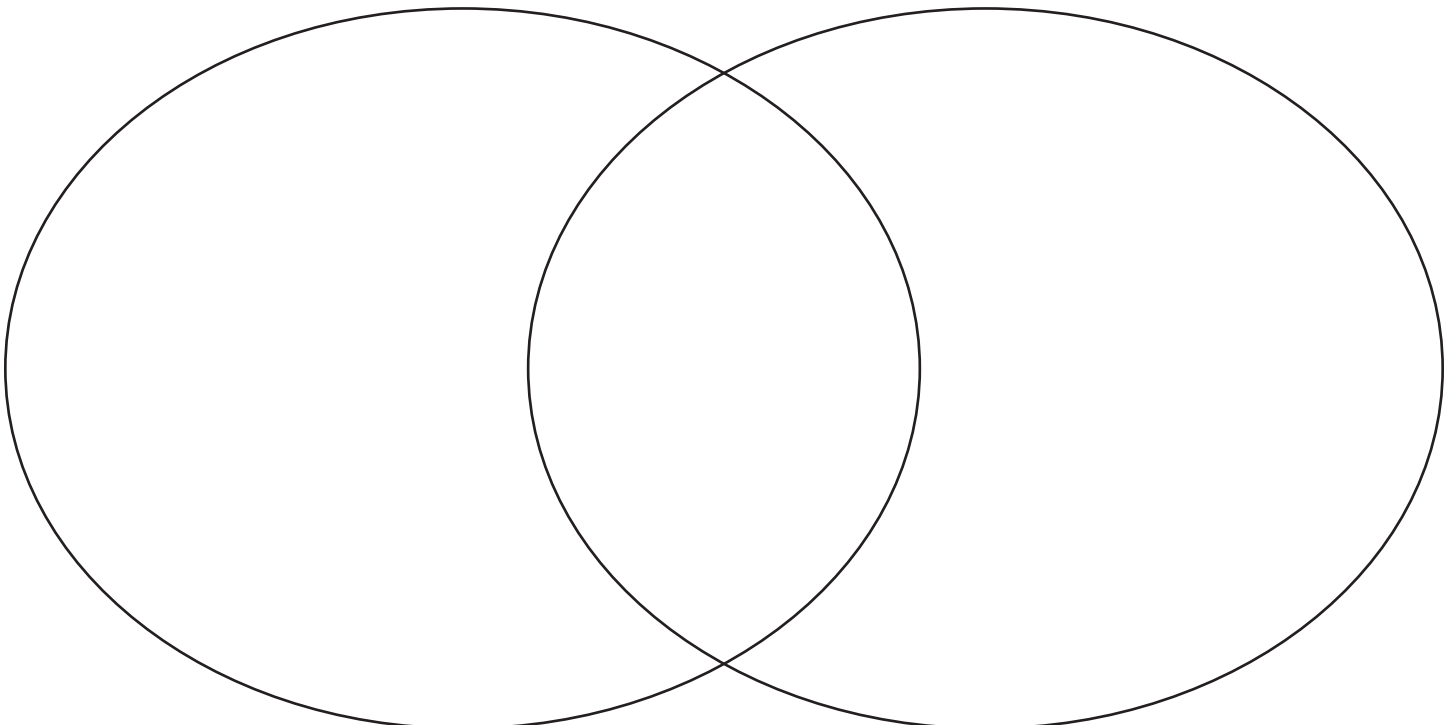
How is nature represented in each design?



Tiffany Studios
Garden Landscape Window
1900-1910



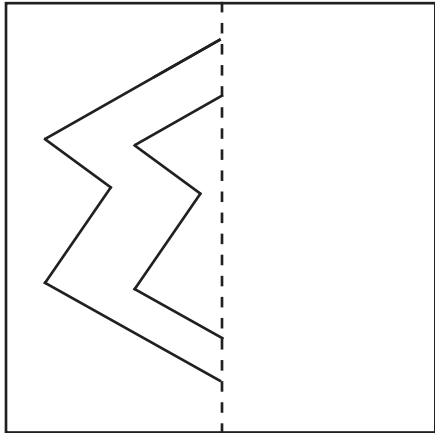
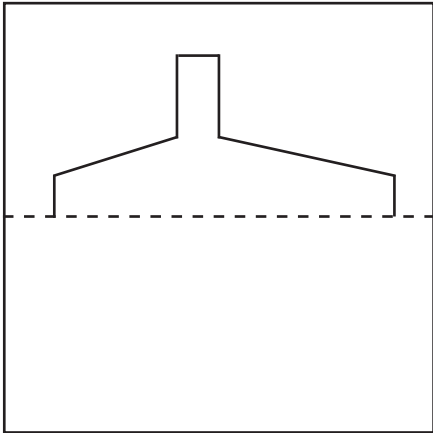
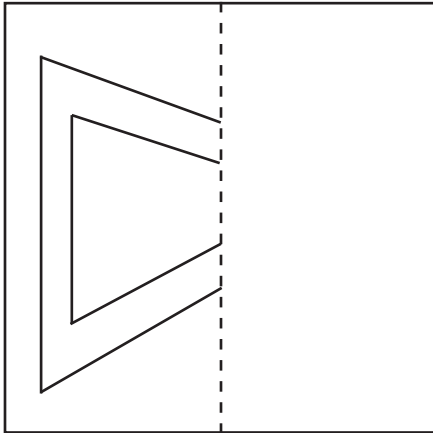
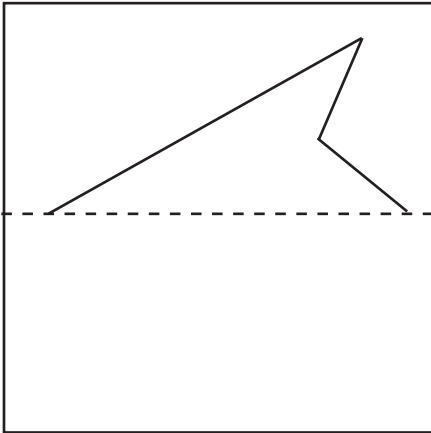
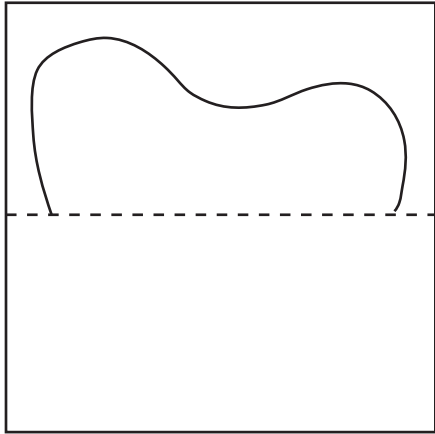
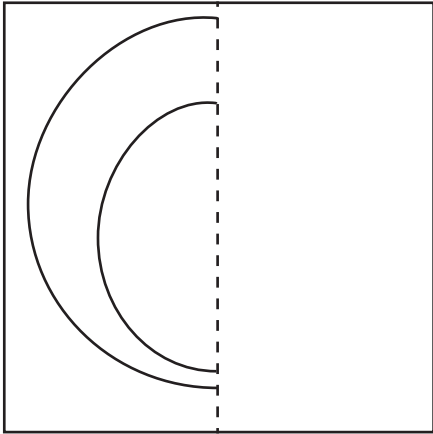
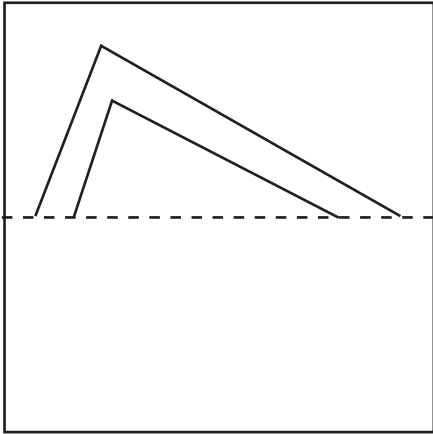
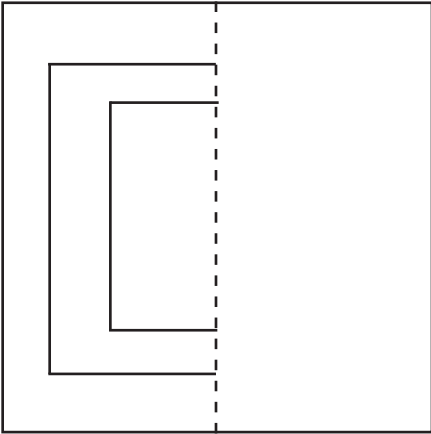
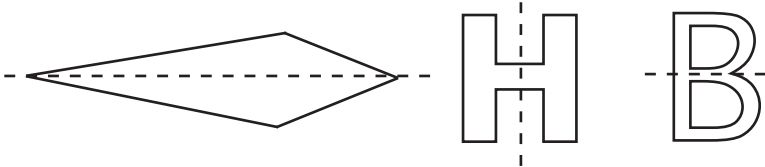
Frank Lloyd Wright
Robie House
1908-1910



SYMMETRY PRACTICE

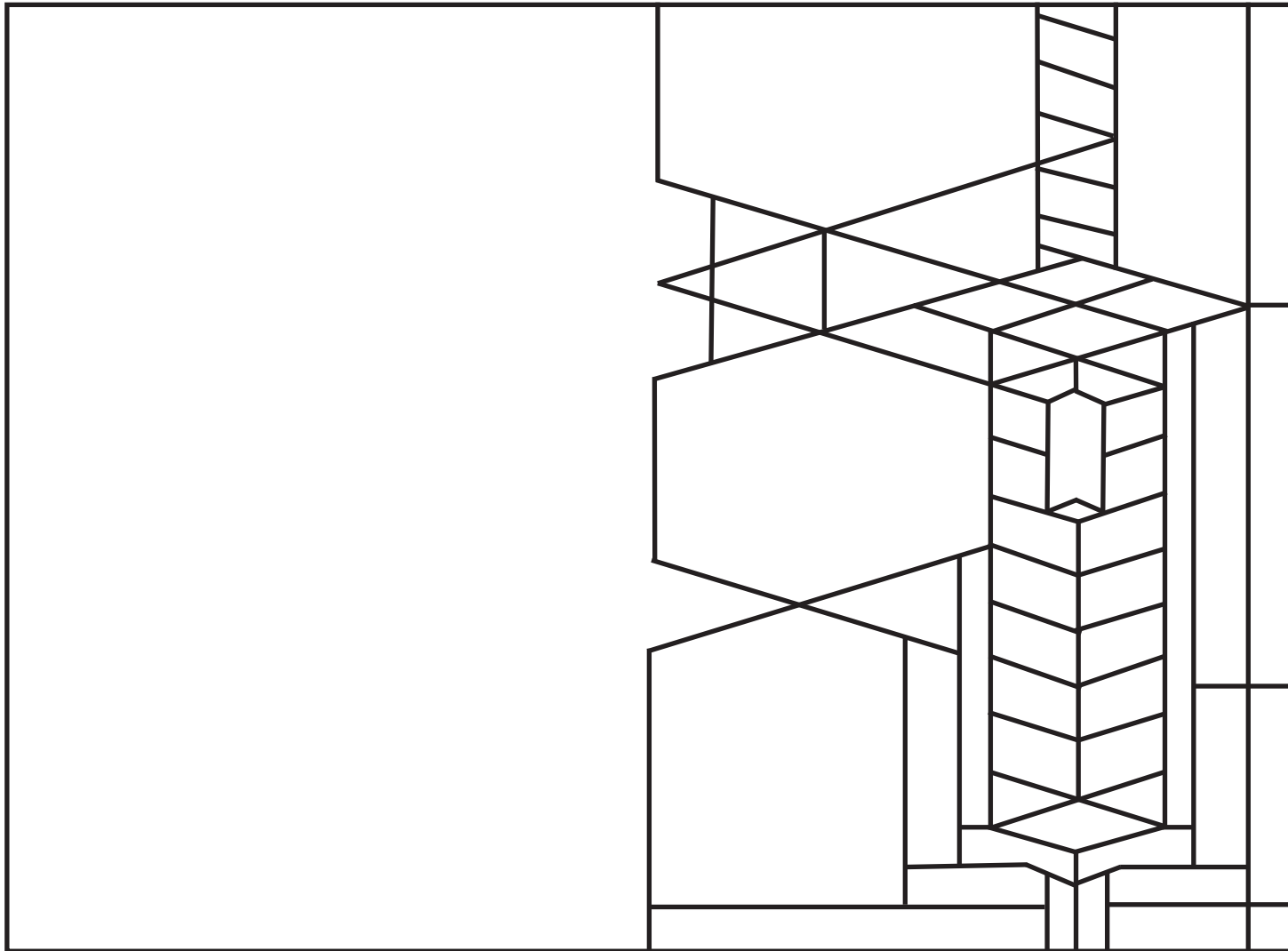
Complete each drawing. (Tip: The dotted line is the line of symmetry.)

Examples:



Complete the other half of Frank Lloyd Wright's symmetrical art glass design!

What shapes did Wright use in this design?

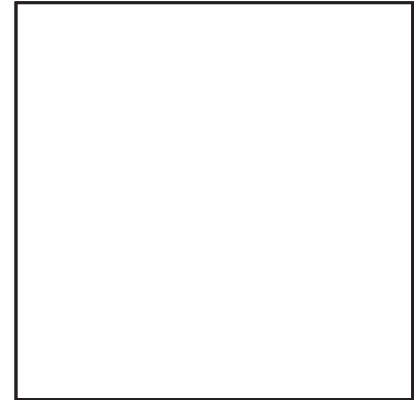
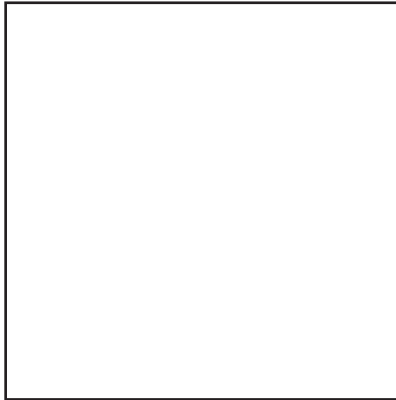
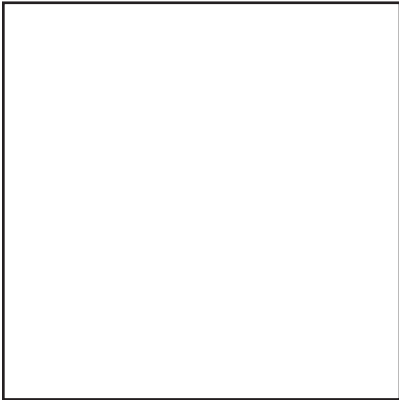




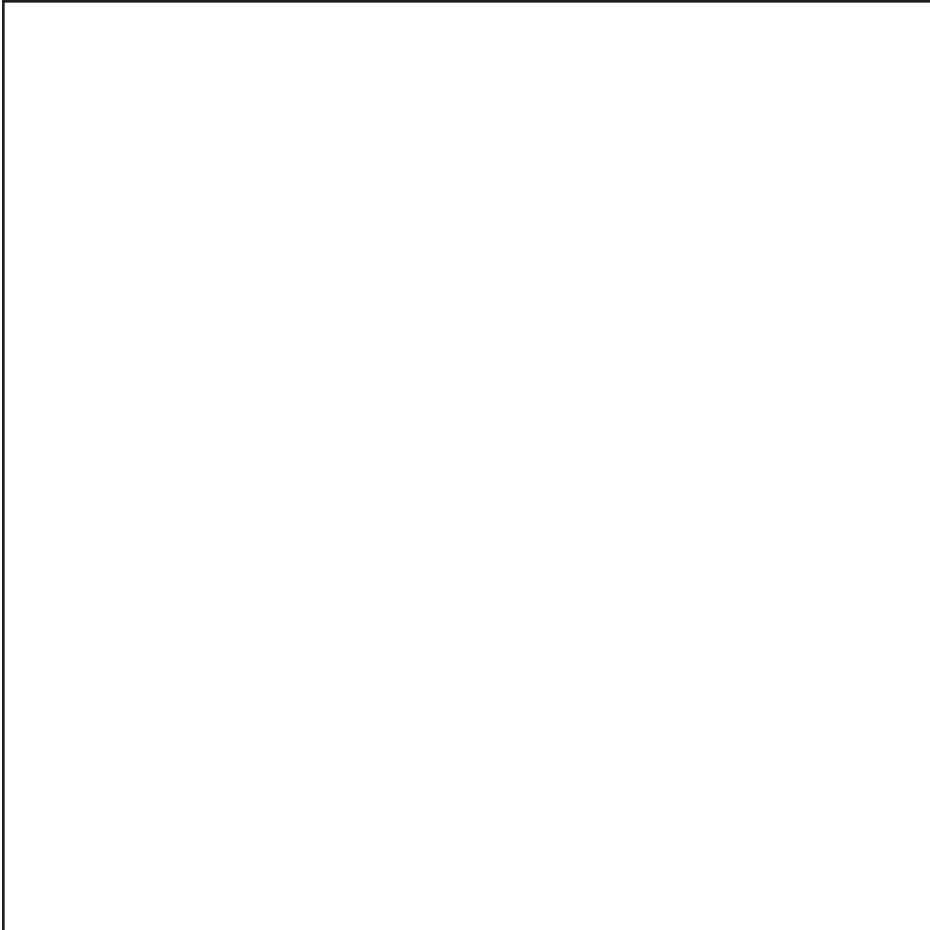
FRANK
LLOYD
WRIGHT
TRUST

PLAN YOUR DESIGN

Sketch an art glass design inspired by nature and geometry in each small box.



Select one sketch to develop further. Draw in the large box.
How did the design change?



Describe how your design is inspired by nature.

