

Architecture 101 with Frank Lloyd Wright

Lesson Plan

Grade Level: 4th Grade

Lesson Length: 3 hours total (spread over 3 class days)
option to do portion of the lesson

Learning Objectives

- Students will identify shapes and patterns in buildings and recognize their aesthetic purposes in architecture.
- Students will calculate the area and perimeter of quadrilaterals.
- Students will analyze the architecture of Frank Lloyd Wright and its relationship with shapes and natural environments.
- Students will apply their knowledge about area/perimeter calculations and the role of architecture in nature by designing their own blueprint of a home.

Essential Questions

- What role do shapes and patterns play when designing a building?
- What are some ways that buildings can coexist with nature?
- How can complex shapes be broken down into simpler shapes in order to calculate area and perimeter?
- What are some common or famous examples of architectural elements and their roles?
- Why is it important to accurately calculate area and perimeter?

Background

Frank Lloyd Wright was an American architect who spent much of his time living and working in Arizona. As evidenced through his work, he believed that the way in which structure and space were designed could act as tools to give architecture more cultural value. He also believed that architecture should be naturally linked to its surroundings. As a result, Wright completed hundreds of works that have made him one of America's greatest architects, many of which are buildings that continue to endure and inspire to this day.

Whether mundane or grandiose, architecture is everywhere. Each building is designed the way it is for a reason. They are each a collection of shapes, patterns, and spaces that come together to create one single structure. In order to successfully design and construct a building, the architect must have a firm grasp on the engineering, math, and aesthetics of their plan to make it come to life.

Materials

- Shapes and Patterns in Buildings worksheets (attached)
 - Crayons, markers, and/or colored pencils
 - Images of famous buildings
- Frank Lloyd Wright slideshow (attached)
- Area and Perimeter worksheets (attached)
 - 8.5x11 graph paper
 - Scissors

- Measuring tape
- Calculators (optional)
- Designing a House student handouts (attached)
 - 11x17 graph paper
 - Drawing paper
 - Markers, crayons, and/or colored pencils
 - Rulers
 - Calculators (optional)
 - Book of house plans/ floor plans (optional)

Vocabulary Words

- | | | |
|-----------------------|----------------------|----------------------------|
| ● Architect | ● Square Units | ● Biltmore Block |
| ● Arch | ● Length | ● Taliesin West |
| ● Column | ● Width | ● Gammage Auditorium |
| ● Cantilever | ● Scale | ● Fallingwater |
| ● Natural Environment | ● Blueprint | ● Arizona Biltmore Resort |
| ● Area | ● Aesthetic | ● San Marcos of the Desert |
| ● Perimeter | ● Frank Lloyd Wright | |

Activity

Suggested format, adapt to meet students' needs

DAY 1: Building Shapes and Patterns

1. Discuss Shapes and Patterns
 - a. Introduce a variety of shapes to students, and explain that one circle is a shape, for example, but two circles together form a pattern.
 - b. Define a pattern as something that repeats, and give examples of patterns using shapes, colors, numbers, letters, nature, and buildings.
2. Introduce Shapes and Patterns Found in Buildings
 - a. Explain that all buildings contain shapes that contain architectural form as windows (squares), columns (lines), doors (rectangles), and towers (triangles) and often create patterns. Ask for examples.
 - c. Give students the worksheet (attached). Students will find patterns in an image of the White House.
3. Find Patterns in the School Building
 - a. Explain to students they will now explore their school to find patterns. As a class, spend 10-15 minutes examining the outside (or inside) of the school. The worksheet is designed to help students identify shapes and patterns in buildings by examining their overall form and parts (attached).
 - b. After students have finished their worksheets, review their patterns.
 - c. Ask them if they think the shapes and patterns make the building appear quiet or loud, bright or dull, simple or complicated. Explain that the sequence or rhythm of shapes and patterns can contribute to the overall "feel" of a place.
4. Introduce architect Frank Lloyd Wright to students (PowerPoint attached).
 - a. Mention what an architect is, and what their role is in constructing buildings.

- b. Mention famous/common elements architects use (patterns, arches, material, shapes, etc).
- c. Talk about how Frank Lloyd Wright liked to use shapes, patterns, and spaces to help the building blend into the natural surroundings.
- d. Examples of buildings that do so are Fallingwater, the Arizona Biltmore Resort, Grady Gammage Memorial Auditorium, Taliesin West, Ocatilla Camp, and the San Marcos of the Desert.
- e. Reinforce the relationship between the previous lesson (Building Shapes and Patterns) and Frank Lloyd Wright implemented this in his work.

DAY 2: Finding the Area and Perimeter of Buildings

1. Review the definitions of area and perimeter. Introduce the formulas to find area and perimeter.
2. Distribute graph paper to each student. Ask students to cut out a rectangle of any size.
 - a. Have them calculate both area and perimeter, either using the formulas or counting the squares/lines on the paper. Have them observe that the answers with either method are the same.
 - b. Re-introduce the formulas for area and perimeter and demonstrate.
3. Distribute Worksheet #1 (Area and Perimeter of Rectangles: attached). Have students complete as a class.
 - a. Instruct students to label the number of units on each side and show their work. They should calculate the area and perimeter for each shape.
4. Repeat process for Worksheet #2 (Area and Perimeter of Rectangles: attached). This worksheet includes shapes without grids.
 - a. Have students calculate area and perimeter, and to show their work. Go over as a class.
5. Distribute more graph paper. Ask two student volunteers to measure the length of each wall of the classroom using a measuring tape. Have students announce their measurements.
 - a. Other students should draw a diagram of the classroom on their graph paper for a visual aid and label the appropriate sides with the corresponding measurements. Their diagram should be to scale, i.e. 1 graph paper square = 1 foot.
 - b. After each of the walls has been measured, have students work in groups of 2-4 to calculate the area and perimeter of the classroom, making sure to include the correct units.
 - c. Go over the correct answers with the class once students are done.
6. Distribute Worksheet #3 (Area and Perimeter of Rectangles: attached).
 - a. Do not have students calculate area and perimeter right away. Instead, have students answer the written question.
 - b. Afterwards, as a whole class, guide students through the process of how to break down the shape into smaller rectangles and their corresponding lengths/widths.
 - c. Calculate the total area and perimeter as a class.
7. Homework: have students take graph paper and measure the length/width of the walls of their bedroom. Students should draw their room to scale on the graph paper (ex: 1 graph paper square = 1 foot). Provide graph paper.

DAY 3: Designing a House Project

Students will apply skills and knowledge learned from previous lessons by designing their own single story house as a homework project. Each student should be given an 11x17 sheet of graph paper and a sheet of drawing paper.

1. Distribute assignment sheet to go over instructions with students (attached).
2. Distribute graph paper and go over instructions for the first part of the assignment: drawing a blueprint.

- a. Inform students that the blueprint of the house should be to scale on the graph paper (one grid square = one foot), like their area/perimeter activity from Day 2.
 - b. Students should clearly mark on their design where walls, doors, and open walkways (windows optional). Show examples as necessary (attached on assignment).
 - c. Students should also correctly label each room and correctly label units (length of each wall in feet, correct square footage in each room). Show examples as necessary.
 - d. Encourage students to use creativity when coming up with rooms to include.
3. Distribute drawing paper and go over instructions for the second part of the assignment: drawing the outside of the house.
- a. Inform students that the drawing should be colored.
 - b. The exterior of the house should include at least two recurring shapes/patterns, and the building should blend into the natural environment around it, just like Frank Lloyd Wright's buildings.
 - 1) Note to students that they may have to also draw part of the natural setting around the house (i.e. lots of trees around to indicate a forest, cacti and sand for desert, etc.). Encourage them to think of some of Frank Lloyd Wright's buildings to get ideas.
 - c. Allow the students 2-3 days to complete the project at home.

Additional Resources

- Frank Lloyd Wright Foundation: www.franklloydwright.org
- Frank Lloyd Wright on Chandlerpedia: http://chandlerpedia.org/Collections/Archival_Items/Documents/People/W/Wright%2C_Frank_Lloyd
- *Frank Lloyd Wright in Arizona* by Lawrence W. Cheek

Standards

Arizona State 4th Grade Content Standards

Social Studies: Strand 4, Concept 2, PO 1	Describe how the Southwest has distinct physical and cultural characteristics.
Visual Arts: VA.RE.8.4	Interpret art by referring to contextual information and by analyzing relevant subject matter, use of media, and elements and principles or artistic norms of the culture within which the artwork is made
Visual Arts: VA.CN.11.4	Through observation, infer information about time, place, and culture in which a work of art was created (such as examining genre scenes, cityscapes, or portraits from different eras).
Math: 4.MD.A.3	Apply the area and perimeter formulas for rectangles in real world and mathematical problems. For example, find the width of a rectangular room given the area of the flooring and the length, by viewing the area formula as a multiplication equation with an unknown factor.
Math: 4.MP.2	Reason abstractly and quantitatively.
Math: 4.MP.4	Model with mathematics.