

## Measuring Frank Lloyd Wright

**Name:** Amanda Staller

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**Grade Level:** Grade 3

**Content area(s):** Math and Art

**Classroom Time:** Two 57 minute sessions

**Purpose:** Review TAKS Math Objective 5.

**Skills Addressed:**

Math skill: Finding area with measurement

Visual Arts Skill: Designing and creating a 2-D architectural piece.

**Supplies:**

Magazines, newspaper, scissors, glue stick, pencil, ruler, ½ white poster board, notebook paper and colored pencils

**Lesson Process:**

A. Warm-up –

Read the short biography of Frank Lloyd Wright below to introduce the architectural lesson.

*“Frank Lloyd Wright (June 8, 1867 – April 9, 1959) was an American architect, interior designer, writer and educator, who designed more than 1,000 projects and completed more than 500 of these works.”*

Show students the prints of Frank Lloyd Wright’s homes and buildings for discussion and motivation. (See attached)

- Do any of the buildings look familiar? – *Answers will vary.*
- If you could live in one of them, which one would you choose? - *Answers will vary.*
- Why did you select the one you did? - *Answers will vary.*
- What appears to be similar to the home where you live? – *They have roofs, windows, corners, etc.. possibly nothing*
- What appears to be different to the home where you live? – *Size, shape, yard, more angles, etc.*
- What did you notice about the ways and how the buildings fit the landscapes? Is that important? *Often the architecture compliments the landscape and vice versa, and even blends into the landscape*
- What elements of nature are seen in the architecture? *Note the organic shapes in the buildings, etc.*
- Do you notice any similarities between the buildings? – *More than one floor, roofs, chimneys, the floors stick out or there is a separation between them, etc.*



- Do you notice any differences between the buildings? – *Some are circular and others are square or both, pointed roofs vs. flat roofs, etc.*
- What types of math would be used in creating the buildings and architecture? – *Measurement, angles, area, volume, perimeter, etc...(multiplication, addition)*
- Math and art are used together to create buildings, what are some ways they are used together? – *Shapes are used as the basis our structure of the building. The shapes are put together in a way to make it appealing. The art is part of the way the building looks; the math is used to make sure the building is able to stand. Etc..*

B. Lesson procedure –

- Demonstrate where to find the measurements on the ruler. *Ex.1 inch, 2 inches, 3 inches, 1/2 inch, 2.5 inches, etc.*
- Put students in groups of four.
- Each student's seat in each group is labeled A, B, C, or D or assign a letter to each student.
- The group is given a laminated direction sheet.
- Each letter on the direction sheet corresponds to the student's letter and corresponds to a specific assignment. (see below, sheets attached) The student will only do the letter assigned to them.

○ *Find the area and cut out :*

*A- Five      2"x 3" rectangles*

*B- Two      4"x5" rectangles*

*C- Ten      1"x1" squares*

*D- Five      .5" x 5.5" rectangles*

- Distribute magazines and newspapers.
- Following their specific assignment, students will begin measuring the first measurement horizontally on a page from a magazine or newspaper. They will mark the beginning and the end of their line segment. The students will turn their paper 90°, starting with the top end of the original line they will draw another line horizontally the second length. They will go to the bottom end of the first line and repeat. Using their ruler they will connect the ends of the last two lines. After connecting the ends they will measure the line ensuring it is the same length as the original line, constructing either a rectangle or a square. The students will cut out at least 10 colorful rectangles and squares from the magazines and newspapers.

*Remind them to use a pencil to draw out measured lines before cutting them out. Make a "pocket" from a folded paper to keep track of loose pieces.*

- After all of the shapes have been cut out, each student is given one of each shape.

- The student finds the area of each shape showing their work and writing their answers on a piece of notebook paper. – *A = 6 sq in, B = 20 sq in, C = 1 sq in, and D = 2.75 sq in.*
- Each group will be given a ½ piece of poster board to assemble a home or a building using *all of the shapes* from their group.
- Students carefully glue down pieces on the poster board.
- Provide colored pencils for students to design a landscape. Stress the idea of landscapes that fit the architecture.

**B. Student Assessment/Final product to be developed:**

- Students review and practice finding the area of rectangles and squares. – *Sheet with calculations and areas of the four sizes of rectangles (A = 6 sq in, B = 20 sq in, C = 1 sq in, and D = 2.75 sq in.)*
- Students construct buildings using the shapes they created. – *Poster board with buildings glued to it.*
- Students observe the connections between math, art and architecture. – *Use shapes to create buildings.*

**C. Extension activities (optional):**

- Students find the total area of the shapes used to create their building. – *Answers will vary*
- Students find the area of the poster board.
- The poster boards are hung touching each other on the wall to create a “city.”
- Students find the total area of their “city.”
- Students write a description of their building.
- Investigate Frank Lloyd Wright and his work (*see web-links*). Discuss the sizes of his buildings and how they relate to the size of their classroom. (Find the area of the floor of the classroom.)
- Use cardboard or boxes to create a structure similar to one of Frank Lloyd Wright’s buildings.

**Helpful Websites:**

[http://en.wikipedia.org/wiki/Frank\\_Lloyd\\_Wright](http://en.wikipedia.org/wiki/Frank_Lloyd_Wright)

<http://www.geocities.com/soho/1469/flw.html>

**Classroom activities:** <http://www.pbs.org/flw/resources/classroom.html>

**Architecture pictures:** [http://www.bc.edu/bc\\_org/avp/cas/fnart/fa267/FLW.html](http://www.bc.edu/bc_org/avp/cas/fnart/fa267/FLW.html)

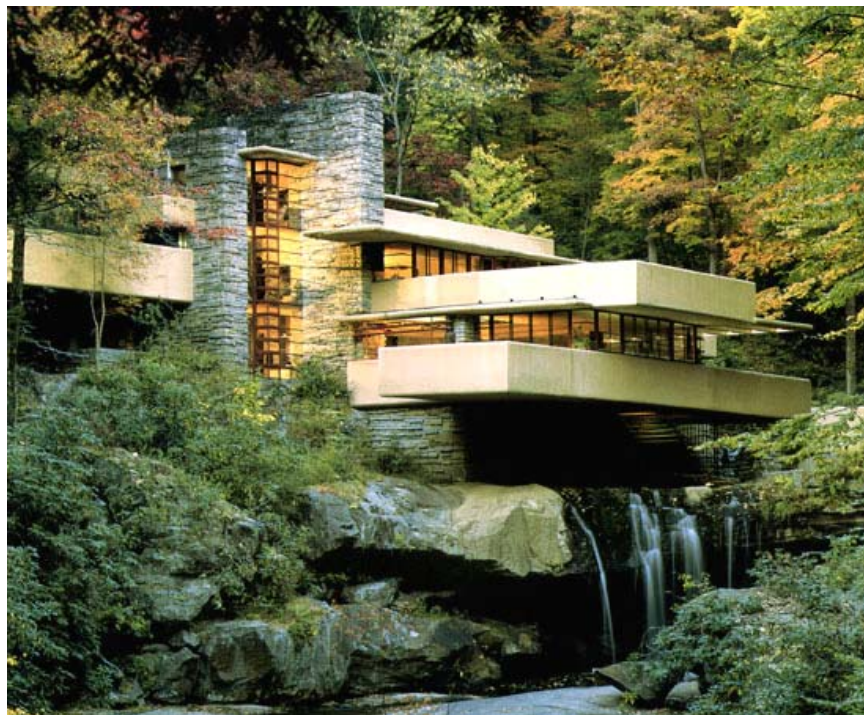
**Student work:** <http://www.myhero.com/myhero/hero.asp?hero=flwright>,

[http://xroads.virginia.edu/~CLASS/am483\\_95/projects/wright/](http://xroads.virginia.edu/~CLASS/am483_95/projects/wright/)

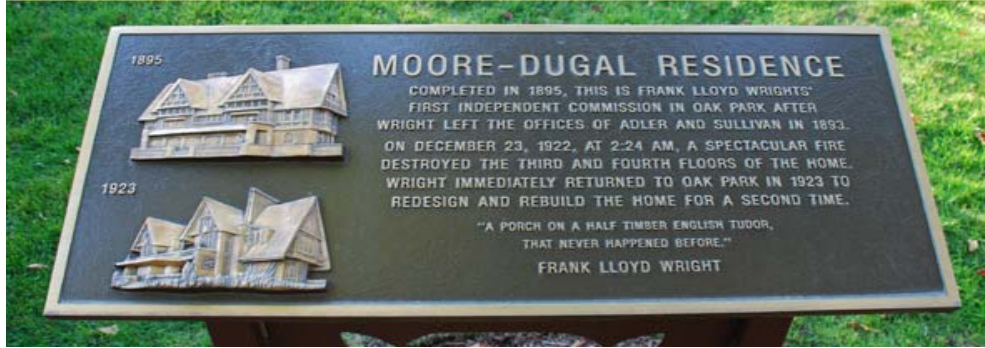
## Frank Lloyd Wright Buildings



**Hills-DeCaro home (Frank Lloyd Wright) in Oak Park, IL**



**Kaufmann house above waterfall, Frank Lloyd Wright, architect**



**Westcott House, Ohio**



**Guggenheim Museum, New York City**



**Johnson Wax Building · Racine, Wisconsin**

**Group Directions –**  
**Copy, cut out and laminate if desired.**

**Find the area and cut out:**

**A: Five 2''x 3'' rectangles**

**B: Two 4''x 5'' rectangles**

**C: Ten 1''x 1'' squares**

**D: Five .5''x 5.5'' rectangles**

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# National Standards (Math and Art)

## MATHEMATICS

**NM-MEA.3-5.1**: Understand measurable attributes of objects and the units, systems, and processes of measurement

- understand such attributes as length, area, weight, volume, and size of angle and select the appropriate type of unit for measuring each attribute;
- understand the need for measuring with standard units and become familiar with standard units in the customary and metric systems;
- carry out simple unit conversions, such as from centimeters to meters, within a system of measurement;
- understand that measurements are approximations and how differences in units affect precision;
- explore what happens to measurements of a two-dimensional shape such as its perimeter and area when the shape is changed in some way.

**NM-MEA.3-5.2**: Apply appropriate techniques, tools, and formulas to determine measurements

- develop strategies for estimating the perimeters, areas, and volumes of irregular shapes;
- select and apply appropriate standard units and tools to measure length, area, volume, weight, time, temperature, and the size of angles;
- select and use benchmarks to estimate measurements;
- develop, understand, and use formulas to find the area of rectangles and related triangles and parallelograms;
- develop strategies to determine the surface areas and volumes of rectangular solids.

## ART

**NA-VA.K-4.2** Using Knowledge of Structures And Functions

- Students know the differences among visual characteristics and purposes of art in order to convey ideas
- Students describe how different expressive features and organizational principles cause different responses
- Students use visual structures and functions of art to communicate ideas

**NA-VA.K-4.4** Understanding the Visual Arts in Relation to History and Cultures

- Students know that the visual arts have both a history and specific relationships to various cultures
- Students identify specific works of art as belonging to particular cultures, times, and places
- Students demonstrate how history, culture, and the visual arts can influence each other in making and studying works of art

# TAKS Objectives

## MATHEMATICS

### Objective 4

**(3.11) Measurement.** The student directly compares the attributes of length, area, weight/mass, and capacity, and uses comparative language to solve problems and answer questions. The student selects and uses standard units to describe length, area, capacity/volume, and weight/mass. The student is expected to: (A) use linear measurement tools to estimate and measure lengths using standard units; (B) use standard units to find the perimeter of a shape; (C) use concrete and pictorial models of square units to determine the area of two-dimensional surfaces; (D) identify concrete models that approximate standard units of weight/mass and use them to measure weight/mass; (E) identify concrete models that approximate standard units for capacity and use them to measure capacity; and (F) use concrete models that approximate cubic units to determine the volume of a given container or other three-dimensional geometric figure.

**(3.14) Underlying processes and mathematical tools.** The student applies Grade 3 mathematics to solve problems connected to everyday experiences and activities in and outside of school. The student is expected to: (A) identify the mathematics in everyday situations; (B) solve problems that incorporate understanding the problem, making a plan, carrying out the plan, and evaluating the solution for reasonableness; (C) select or develop an appropriate problem-solving plan or strategy, including drawing a picture, looking for a pattern, systematic guessing and checking, acting it out, making a table, working a simpler problem, or working backwards to solve a problem; and (D) use tools such as real objects, manipulatives, and technology to solve problems.

### ART

**(1) Perception.** The student develops and organizes ideas from the environment. The student is expected to: (A) identify sensory knowledge and life experiences as sources for ideas about visual symbols, self, and life events; and (B) identify art elements such as color, texture, form, line, space, and value and art principles such as emphasis, pattern, rhythm, balance, proportion, and unity in artworks.

**(2) Creative expression/performance.** The student expresses ideas through original artworks, using a variety of media with appropriate skill. The student is expected to: (A) create artworks based on personal observations and experiences; (B) develop a variety of effective compositions, using design skills; and (C) produce drawings, paintings, prints, constructions, ceramics, and fiberart, using a variety of art materials appropriately.

**(3) Historical/cultural heritage.** The student demonstrates an understanding of art history and culture as records of human achievement. The student is expected to: (A) compare content in artworks from the past and present for various purposes such as telling stories and documenting history and traditions; (B) compare selected artworks from different cultures; and (C) relate art to different kinds of jobs in everyday life.