Public Art
University of
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BE A TOOTHPICK ARCHITECT: GEOMETRY AND JORGE PARDO'S FOLLY

Recommended for Grades K-5

Keywords: Architecture, Design, Geometry, Math, STEM, STEAM

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OVERVIEW

Be a Toothpick Architect: Geometry and Jorge Pardo's *Folly*
Written by Debra Barrera and edited by Lauren Cross

Students construct their own structures from toothpicks and modeling clay inspired by Jorge Pardo's *Folly*. In this lesson, students explore Jorge Pardo's *Folly*, then create simple toothpick and clay structures and imagine walking into and interacting with their own miniature folly.

Objectives:

- Students will use geometric vocabulary to describe shapes and forms that they see.
- Students will achieve a creatively constructed 3-dimensional object while playfully investigating spatial and physical limitations of their structures.

Essential Questions:

- How do artists take inspiration from other structures to create their own designs?
- How do some artworks incorporate math and geometry?

LEARNING STANDARDS

Texas State Standards (TEKS):

Kindergarten, Mathematics, Title 19, Part 2, Chapter 111, Subchapter A, Rule §111.3, (6)A,B,C,D,F
Grade 1, Mathematics: Title 19, Part 2, Chapter 111, Subchapter A, Rule §111.3, (6)C,D,E,F
Grade 2, Mathematics: Title 19, Part 2, Chapter 111, Subchapter A, Rule §111.3, (8)B,C,D

> **Geometry and measurement.** The student applies mathematical process standards to analyze attributes of two-dimensional shapes and three-dimensional solids to develop generalizations about their properties.

Jorge Pardo, *Folly* (artist renderings), 2021. Location: University of Houston

ABOUT JORGE PARDO

Jorge Pardo was born in 1963 in Havana, Cuba, grew up in Chicago, USA, and currently lives and works in Mérida, Mexico. His large-scale installation *Folly* is on display at Wilhelmina's Grove at the University of Houston from December 2021 through August 2022. The work is part of the Temporary Public Art Program of Public Art of the University of Houston (Public Art UHS).

A "folly" is a small ornamental building or structure that is designed for pleasure and leisure. The word comes from the French "folie," which means "foolishness." Follies can also be called "eyecatchers." These structures were popular in 18th century gardens in England and France, though today they can be found in varied spaces from public parks to urban plazas. The Egyptian Sphynx outside of the Hotel Luxor in Las Vegas is a famous example of a modern-day folly!

Jorge Pardo's *Folly* has a simple structure, but the architectural details like the abstract painted mural interior and the organic-shaped light fixtures (like the one in the image below) can intrigue and inspire viewers. The exterior walls are made of waterproof panels, and the interior consists of hand-painted and laser-cut wood panels. Inside, the artist's sculptural chandeliers illuminate the architecturally scaled space. The artwork combines sculpture, painting, architecture and design into a single environment: "It's a total work of art," said María C. Gaztambide, Director and Chief Curator of Public Art UHS.

Learn more about *Folly* at publicartuhs.org/events/folly.

CLOSE LOOKING: INTRODUCTION

Objective:

- Students will use geometric vocabulary to describe shapes and forms that they see.

Estimated Length: 10 minutes

Method:

1. Introduce the concept of the word "Folly," the title of the piece. A folly is an architecture term for a decorative building or structure. They are usually large enough to go inside, and can be found in British and French gardens as well as in public parks. Its purpose is purely pleasure—a folly is meant to be fun!
2. Show students Jorge Pardo's *Folly* via an on-campus tour or publicartuhs.org/folly publicartuhs.org/educator-resources/toothpick-architect and ask students to observe the video and artwork silently.
3. Ask students to describe what they see. Prompt students to put their observations in context:
    - How is *Folly* similar or different to other buildings or structures you have seen?
    - Is there anything that Pardo said about his artwork that you found interesting?
    - How do you think it would feel to walk around the inside and outside of *Folly*?
4. Bring students' attention to shapes and forms that they see in the structure.
    - What geometric shapes do you see (walls, doors, windows, roof, etc.)?
    - What shapes or forms do you recognize in the structure (triangle, cube, etc.)?
    - As you walk all the way around *Folly*, how many different sides do you see? Remind students to include the roof and the floor as they count.
5. **Transition:** Even though a garden folly can look very creative, it is still a piece of architecture—it has to stand up and be sturdy enough to have people inside it! Introduce the art-making activity by telling students that they will be creating their own folly, starting with a stable structure and then adding creative decoration.

ACTIVITY: ART-MAKING

Objective: Students will achieve a creatively constructed 3-dimensional object while playfully investigating spatial and physical limitations of their structures.

Estimated length: 40 minutes

Materials Needed:
- Toothpicks
- Modeling clay or craft putty
- Typing paper or craft paper
- Scissors and craft glue
- Optional: decorating supplies like markers, glue glitter, pens, or pipe cleaners.

Method:
1. Distribute or have students select a piece of craft paper to act as a structure base. This will make it easier to move the structure once it is complete.
2. Instruct students to tear off pieces of craft putty and roll them into about 15-20 balls. These will act as mortar for the sculptures.
3. Ask students to begin by constructing simple 2-dimensional shapes using toothpicks. Remind students of vocabulary that describes 2-dimensional shapes, including: triangle, square, rectangle. Use Reference Sheet as needed.
4. Then, invite students to combine and build from their 2-dimensional shapes to create 3-dimensional forms. Remind students of vocabulary that describes 3-dimensional shapes, including: triangular, rectangular, prism, pyramid, cube. Use the Reference Sheet at the end of this lesson plan as a visual aid.
5. Then, invite students to combine shapes and forms together to create a larger structure. Ask students: What shapes and forms are included in your structure? Which are the most sturdy? How high can you build your structure before it becomes unstable?
6. Once students have completed a sturdy structure, invite them to use paper or other decorative materials to add walls, a roof, or other flourishes to their structure.
7. Reflection/Share: Invite student volunteers to share their structure, using descriptive language and geometric vocabulary to describe their process and the final result:
    - What 2-dimensional shapes are included in your structure?
    - What 3-dimensional forms are included in your structure?
    - Are there any shapes or forms in your structure that you do not know the name for? How else might you describe the shape or form, using vocabulary that you do know?
    - Which shape did you find to be the most stable? How stable is a 3-dimensional form compared to a 2-dimensional form? Were there any shapes that fell over?

Lesson Adaptations or Extensions:
Imagination and Scale: Encourage students to use their imagination to think about how their structure could be experienced if it were as large as Jorge Pardo's *Folly* and placed in a garden or other space. Invite students to tell the class more about their artwork by creating a story about their structure or imagining visiting their structure in real life:

- If my structure could be scaled up, how large would it be?
- Where would my structure go in the world or maybe where in the universe?
- Who or what could visit my structure? (Possible answers: people, dogs, lions?)
- What do I like best about my structure?

Higher Grade Levels: Students in higher grade levels may choose to create more ambitious structures with the allotted time. In addition to identifying shapes and forms, students may measure their properties. For instance:

- Identify the points, lines, and planes of the structure.
- Find 3 different angles in the structure and designate if they are acute, right, obtuse, or straight angles. Use a protractor to measure the angles in degrees.
- Measure with a ruler and calculate the overall dimensions of the final structure (height x width x depth). If you imagine that each inch of your structure would scale up to a foot, how would it compare to Jorge Pardo's *Folly*?
  - Would your sculpture fit on top of a table?
  - Would your sculpture fit inside the classroom?
  - Would your sculpture be large enough for you to fit inside it?
- Measure and calculate the area of a square, rectangle, or triangle in the structure. First, sketch a schematic of the shape and mark the lengths to measure. Then, after measuring, use a calculator to determine the area:

Square or Rectangle:	Area = length x width
Triangle: Area:	Area = length of the base x height / 2 *or* Area = ½ x length of the base x height

ADDITIONAL RESOURCES

Artwork Page: publicartuhs.org/events/jorge-pardo

Bibliography and Sources:

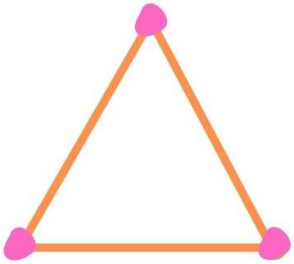
1. Pardo, Jorge. "When Art and Nature cross each other's paths." TEDxArchivorum, TEDx Talks. Posted Jan. 22, 2021. www.youtube.com/watch?v=ElHRvWkE9L0

2. Tubbs, Sara." 'Folly' is Coming to UH", University of Houston, April 29, 2021. stories.uh.edu/2021-april29-folly-coming/index.html

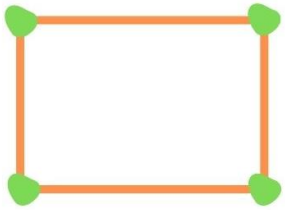
Glossary:

2-dimensional (2-D)	A 2-dimensional (2-D) shape is flat, and is measured in two dimensions: the length and the width.
3-dimensional (3-D)	A 3-dimensional form (3-D) has depth, and is measured in three dimensions: the length, width, and height.
Cube	A type of rectangular prism in which all sides are equal.
Folly	A small ornamental building or structure that is designed for pleasure and leisure. The word comes from the French "folie" or "foolishness."
Form	A geometric figure that is 3-D. Form is also one of the elements of art, and refers to elements with volume in a 3-D work of art (like a sculpture).
Prism	A 3-D form with 2 identical ends and flat, rectangular sides. A rectangular prism (with identical triangles at each end) and a rectangular prism (with identical rectangles at each end) are examples of prisms.
Pyramid	A 3-D form comprised of a base shape and triangular sides which meet at a point. A triangular pyramid (with a triangle base) and a rectangular pyramid (with a square or rectangle base) are examples of pyramids.
Rectangle	A 2-D shape with 4 sides and 4 right angles.
Shape	A 2-D geometric figure. Shape is also one of the elements of art, and refers to flat elements in a 2-D work of art (like a painting or drawing).
Square	A 2-D shape with 4 equal sides and 4 right angles. A type of rectangle.
Triangle	A 2-D shape with 3 sides and 3 angles.

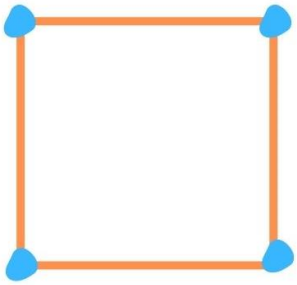
REFERENCE SHEET: 2-D and 3-D SHAPES



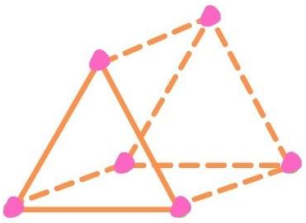
TRIANGLE



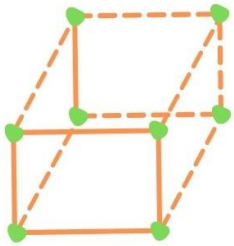
RECTANGLE



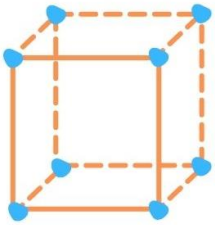
SQUARE



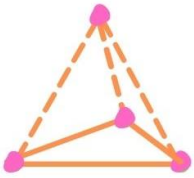
TRIANGULAR PRISM



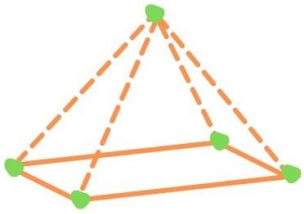
RECTANGULAR PRISM

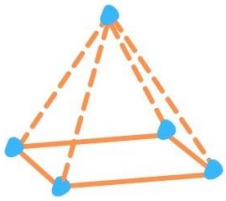


CUBE



TRIANGULAR PYRAMID





RECTANGULAR PYRAMID