

ENGINEERING PICASSO'S WORLD

A WALK THROUGH PICASSO'S WORLD



Overview & Purpose

Students will transform into Mathematicians and Architects as they identify geometric shapes through the world of Picasso's art work and through the exploration of architectural structures located in Spain. They will continue as Engineers to construct a city using geometric shapes.

Education Standards

(3.6) Mathematics

The student is expected to:

- (A) classify and sort two- and three-dimensional solids, including cones, cylinders, spheres, triangular and rectangular prisms, and cubes, based on attributes using formal geometric language;
- (B) use attributes to recognize rhombuses, parallelograms, trapezoids, rectangles, and squares as examples of quadrilaterals and draw examples of quadrilaterals that do not belong to any of these subcategories;

Materials Needed

1. Copy of "Factory at Horto de Ebro, 1909" by Pablo Picasso
2. Geometry shapes Vocabulary Cards
3. <http://www.pablocicasso.org/cubism.jsp> (for Teacher reference only)

4. Art supplies for building their city - construction paper, pipe cleaners, tape, markers, crayons, glue sticks, dowel rods, popsicle sticks, etc.
5. Base of city could be made of: large sheets of construction paper, cardboard pieces, poster board, etc.
6. Geometric Wooden Blocks manipulatives

Vocabulary

Cylinders
Spheres
Cones
Rectangular Prisms
Cubes
Rhombuses
Parallelograms
Trapezoids
Rectangles
Squares
Perpendicular Lines
Parallel Lines
Angles
Cubism

Student Objectives

1. When playing Geometry I Spy, stop and ask students to explain what attributes they notice within the shapes (parallel sides, right angles, perpendicular lines, etc.)
2. Students will label and identify geometric shapes within the “city” they will be creating.
3. Students will use engineering and mathematical skills to build a small scale city using geometric shapes.

Activity

1. Play Geometry I Spy using Picasso’s art work “Factory at Horta de Ebro, 1909”. For example: “I Spy a **quadrilateral**.” “I Spy a **parallelogram**.”
2. Have cut out shapes to place directly on the art piece, or use an Interactive Whiteboard and highlight the shapes that students point out during Geometry I Spy.
3. Teacher will reinforce geometric shapes using the provided Geometric shapes vocabulary cards. Reinforce with Geometric Wooden Blocks.

4. Explain to students that they are going to be engineers today as they design their version of "Picasso's World".
5. View the Spanish Architecture SlideShow with students. Discuss the architectural structural design of the buildings. Focus on the geometric shapes used to construct their city.
6. Explain to students that they will engineer a city in Spain using two-dimensional and 3-dimensional shapes referencing the table below, keeping in mind the design elements they saw in the Spanish Architecture SlideShow.
7. Geometric Table:

| | |
|--------------------|------------|
| Cylinders | Red |
| Spheres | Orange |
| Cones | Yellow |
| Rectangular Prisms | Green |
| Cubes | Blue |
| Rhombuses | Purple |
| Parallelograms | Teal |
| Trapezoids | Pink |
| Rectangles | Lime Green |
| Squares | Lilac |

8. Students are encouraged to be as creative as they like in the engineering process.

Extension

Students will recreate a famous architectural building found in any city in Spain using three dimensional shapes. Research the architectural building. When was it created? Who was the architect? What other buildings did that architect design? Are they

similar? What geometric shapes can you identify? What is the history behind the building?

