

Leapfrog Program

Course Title: Blocks & Blueprints

Course Description

A blueprint is a drawing that shows the design of a building or an outdoor area. Using blocks and other construction materials, students create models of buildings and spaces, then use geometry tools and concepts to draw blueprints and scaled diagrams of their creations.

Essential Questions

- How is geometry used in the world around us?
- How does using blocks to design a structure compare to using paper and pencil?
- What are the best ways to represent something three-dimensional on a flat piece of paper?
- How important is accuracy in making scaled diagrams and blueprints?

Outcomes

Learning Outcomes:

Upon successful completion of this course, students will have:

- a. Observed and discussed examples of blueprints and diagrams
- b. Created structures using blocks in a variety of shapes and sizes
- c. Sketched actual size diagrams of block structures
- d. Identified shapes and patterns in blueprints, drawings, photographs, and actual buildings
- e. Measured lines, areas, and angles
- f. Used math functions and data to create scale drawings
- g. Created a final project that includes block structures and corresponding blueprints or diagrams

Instructional Strategies

Students will learn about three architects and connect their drawings and diagrams to the real buildings they designed through whole group and small group instruction. Hands-on use of building blocks will engage students through many modalities and encourage peer learning. Teachers will use observations and direct feedback from students to scaffold individual student instruction. To help student's self-assess and differentiate their own learning, they will be given choices around the types of buildings they create. Teachers will differentiate the type of calculations student are required to do in the creation of their drawings and diagrams. Technological tools, such as computer drawing, will be made available to students that benefit from this type of scaffold.

Resources and Materials

- **Books**
 - a. Beaty, Andrea. *Iggy Peck Architect*. Abrams Books, 2007. ISBN: 081081106X.
 - b. Bodden, Valerie. *Gehry*. Creative Education, 2009. ISBN: 9781583416624.
 - c. Fulton, Brad and Bill Lombard. *A Blueprint for Geometry: Math Projects Series*. Dale Seymour Publications, 1998. ISBN: 1572322780.
 - d. Greenberg, Jan and Sandra Jordan. *Frank O. Gehry: Outside In*. DK Publishing, 2000. ISBN: 0789426773.

- e. Guarnaccia, Steven. *The Three Little Pigs: An Architectural Tale*. Abrams, 2009. ISBN: 9780810989412.
 - f. Laden, Nina. *Roberto: The Insect Architect*. Chronicle Books, 2000. ISBN: 0811824659.
 - g. Stevenson, Robert Louis. *Block City*. Simon and Schuster, 2005. ISBN: 0689869649.
 - h. Thorne-Thomsen. *Frank Lloyd Wright for Kids: His Life and Ideas*. Chicago Review Press, 1994. ISBN: 155652207X.
 - i. Salariya, David and Joanne Jessop. *The X-Ray Picture Book of Big Buildings of the Modern World*. Franklin Watts, 1993. ISBN: 0531143074.
 - j. Zimmerman, Claire. *Mies van der Rohe*. Taschen, 2006. ISBN: 3822836435.
- **Web sites**
 - a. Architect Studio 3D. <http://www.architectstudio3d.org/AS3d/index.html> This website from the Frank Lloyd Wright Preservation Trust allows users to design a building including a scaled drawing, landscaping the exterior, and taking a 3D walk-through of their completed design
 - b. archKIDecture. <http://www.archkidecture.org/index.html> This site includes discussion, resources, and project ideas related to teaching children about architecture.
 - c. Math-Kitecture. <http://www.math-kitecture.com/> This site provides the steps to creating a scaled drawing.
 - d. University of Missouri e-Themes, Architecture. <http://ethemes.missouri.edu/themes/1704> This site provides a multitude of resources to learn more about drawing floor plans, blueprints, and famous architects and structures.

Student Assessment

- **Pre-Assessment**
Students will draw a picture of their home. They will share orally or in writing the shapes, patterns, and angles contained in the buildings they drew. These will be shared at a class group meeting. Guiding questions and transcription will be used to record students' prior knowledge of architecture and blueprints.
- **Documentation of Learning**
Teachers will use a rubric to document students' block structures (i.e. variety of shapes used, identification of shapes, patterns, and angles used, application of knowledge of architectural styles). Students' actual size and scaled drawings of their buildings will document their representations of their buildings, including the use of math functions to calculate scale and the measurement of lines, areas, and angles.
- **Post-Assessment**
Students will present a portfolio of blueprints or diagrams of block buildings they have created, including descriptions of the design elements, tools, and architectural styles represented in their work. They will share a block structure and its corresponding drawing. On the last day of our session, parents are invited to the Expo to view students' work. Parents and teachers will complete a survey in order to contribute feedback during the Expo! At the end of the course students will receive a written evaluation based on general class performance, discussion, participation (whole group and small group) evaluations, and written work. Final Student evaluations are written are mailed out by September 15. Please refer to the Leapfrog Family handbook for more information.

Schedule

Date	Topic(s)	In-class Activities	How will you document learning for assessment?
Monday, July 18, 2011	Shapes in Buildings and Blocks	<p>Draw your home. Share and describe the shapes, patterns, and angles you drew. Discuss what you know about architects and blueprints.</p> <p>What shapes make up buildings? What patterns do you see? Go on an indoor and/or outdoor shape and pattern hunt, using tallies.</p> <p>Investigate and share the shapes of our blocks.</p> <p>Block building, sharing, and documentation.</p>	<p>Pre-assessment: Draw your house. What shapes and patterns appear in your house?</p> <p>Shape tally sheet reveals students' recognition of basic shapes and patterns in buildings and blocks.</p>
Tuesday, July 19, 2011	Mies van der Rohe and Floor Plans	<p>Discuss architecture of Mies van der Rohe, noting shapes and patterns used in his plans.</p> <p>Measure and create a floor plan of our classroom.</p> <p>Investigate the sizes of our blocks.</p> <p>Floor plan block building, sharing, and documentation.</p> <p>Create actual size floor plan drawing of a building.</p>	<p>Anecdotal recording of students' participation in architecture discussion. What observations do they make?</p> <p>Classroom and measurement and worksheets.</p> <p>Photographs and rubric of block buildings and floor plan drawing of block structure.</p>
Wednesday, July 20, 2011	Frank Gehry and Scale	<p>Discuss architecture of Frank Gehry, his designs and the shapes used in his buildings.</p> <p>What is scale? Match scaled windows and people to sizes of drawn buildings.</p> <p>Find ½-scale sizes of our blocks. Differentiation option: find 1/4 – scale sizes of blocks.</p> <p>Block building, sharing, and documentation.</p> <p>Create scaled floor plan drawing using stencils and/or graph paper.</p>	<p>Anecdotal recording of students' participation in architecture discussion. What observations do they make?</p> <p>Scaled sizes of blocks worksheet.</p> <p>Photographs and rubric of block buildings and scaled floor plan drawing of block structure.</p>

Date	Topic(s)	In-class Activities	How will you document learning for assessment?
Thursday, July 21, 2011	Frank Lloyd Wright and Elevation Drawings	<p>Discuss architecture of Frank Lloyd Wright and the shapes in his buildings. Compare floor plans to elevation drawings.</p> <p>Explore two-dimensional representations of three-dimensional buildings with Froebel blocks.</p> <p>Block building, sharing, and documentation.</p> <p>Create elevation drawings of buildings using stencils and/or graph paper.</p>	<p>Anecdotal recording of students' participation in architecture discussion. What observations do they make?</p> <p>Observations of Froebel Block exploration. How do students replicate diagrams of block structures?</p> <p>Photographs and rubric of block buildings and elevation drawing of block structure.</p>
Friday, July 22, 2011	Chicago Landmarks	<p>Discuss Chicago landmark buildings, connecting their design to those of van der Rohe, Wright, and Gehry.</p> <p>Introduce area and practice calculating area using Froebel blocks and architectural drawings.</p> <p>Block building, sharing, and documentation.</p> <p>Create choice of drawings of buildings using graph paper. Calculate area of building.</p> <p>Prepare portfolio and participate in EXPO!</p>	<p>Anecdotal recording of students' participation in architecture discussion. What observations do they make?</p> <p>Area calculation worksheet.</p> <p>Photographs and rubric of block buildings and drawings of block structure.</p> <p>EXPO! survey to be completed by visitors regarding shapes, patterns, and architectural styles in drawings.</p>

CTD Statement on Third-Party Web Sites

Instructors are required to thoroughly review any third-party web sites they intend to use in their courses for inappropriate content. However, because web content continuously changes, CTD disclaims any responsibility for any of the content contained on third-party web sites used in course materials. If you become aware of anything that may be inappropriate, please notify CTD staff immediately.