

Overview

While creating a home design, you will recognize the basic concepts of using geometric shapes within architectural design. You will then apply scale model concepts and square footage calculations to demonstrate a relationship between design and mathematics. These principles come together to create the homes, schools, and businesses that you inhabit each day. Many careers incorporate this knowledge and these skills. This design project will be accomplished using a computer based plan, and a hand drawn scale model.

Essential Questions

1. Why are artists and architects also mathematicians?
2. How can you use the relationships between area, volume, and surface area to help you draw, construct, model, and represent architectural structures?
3. How can you use scale models to represent actual size of architectural structures?
4. What are proportion and scale?
5. How is square footage determined?
6. Who designs building structures, and what does someone need to know to be a designer?

Materials

Laptop Carts
Rubric

Web Sources

<http://www.architectstudio3d.org/AS3d/home.html>
Design Studio

Objectives

You will:

1. Identify geometrical shapes found in building structures
2. Design a home using Architect Studio 3d online program
3. Create a scale model of a simple building structure
4. Determine the square footage of a simple building structure
5. Calculate the cost of finishing one room* (painting all 4 walls and ceiling, and calculate the cost of finishing the floor)

Evaluation

(1) DESIGN WORKSHEET

My Scale:

Actual House Measurements:

Length of House _____

Width of House _____

Total Square Footage _____

Number of rooms _____

Name of rooms and size (square footage):

Reasons I like this house:

(2) GRADING RUBRIC

	Excellent 5	Good 4	Fair 3	Below Av. 2	Poor 0	Weight
Use of Scale Model	All dimensions are labeled correctly and reasonably scaled		Error in 1.		Error in 2 or more.	10 x ____ = ____
Area of Structure	Calculation of sq. footage in each room is reasonable and correct		Error in 1.		Error in 2 or more.	3 x ____ = ____
Surface area and cost of Finished Room*	Calculations of surface area and costs are reasonable and correct		Error in 1.		Error in 2 or more.	2 x ____ = ____
Calculations and conversions of scale model	Work is very neat, easy to read, and has correct math form.	Work is generally neat, easy to read, and has correct math form.	Work is lacking in neatness or readability but still has correct math form.	Work is neat, but does not have correct math form.	Work is too messy and does not have correct math form.	3 x ____ = ____
Creativity	Design is presented in a novel and original way.	Design is presented in a manner that is appropriately creative.	Design is presented in a creative manner.	Design is presented in a somewhat creative manner.	Design lacks creativity.	2 x ____ = ____
TOTAL	*I understand losing my rubric will result in a loss of five points. _____ (Initials) *Projects will be docked 10 points for each day late. _____ (Initials)					

Scale Model and Calculations

- ❖ Complete a scale model of a simple structure – house.
- ❖ Include all of the dimensions of the house and rooms and the scale that you used.
- ❖ Attach a separate paper with detailed calculations of the square footage of the house and each room.
Do not include closets and storage space
One page per floor
- ❖ Include the completed proportions using your scale from the paper model.

Finished Room* Measurements and Costs

	<u>Paper Measurements</u>	<u>Actual Measurements</u>
Length of room		
Width of room		
Perimeter of room		
Area of Window(s)		
Area of Door(s)		

(1) Area and Cost of Floor Covering

(2) Area and Cost of Painting

(all 4 walls --don't forget to consider windows and doors)

Questions for an Architect

After completing this project, list any questions you may have for an architect or designer.