

Build a Clubhouse Using SketchUp

Overview:

Students put their understanding of geometry into practice by constructing three-dimensional clubhouse using SketchUp.

Grades and Subject Areas:

Grade 5-6 Geometry

Objectives:

Students will be able to:

- Recognize, name, draw and compare two and three-dimensional shapes.
- Use two-dimensional shapes to represent three-dimensional figures.

I Can Statements:

- I can draw polygons on the coordinate plane.

Curriculum Connections:

Alaska Math Standards, adopted June 2012:

Geometry 6.G

Solve real-world and mathematical problems involving area, surface area, and volume.

6.G.3. Draw polygons in the coordinate plane given coordinates for the vertices; determine the length of a side joining the coordinates of vertices with the same first or the same second coordinate. Apply these techniques in the context of solving real-world and mathematical problems.

ISTE Student Standards:

- **Creativity and Innovation**

Students demonstrate creative thinking, construct knowledge, and develop innovative products and processes using technology. Students:

- a. apply existing knowledge to generate new ideas, products, or processes
- c. use models and simulations to explore complex systems and issues

ISTE Teacher Standards:

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- **Facilitate and Inspire Student Learning and Creativity**

Teachers use their knowledge of subject matter, teaching and learning, and technology to facilitate experiences that advance student learning, creativity, and innovation in both face-to-face and virtual environments. Teachers:

a. promote, support, and model creative and innovative thinking and inventiveness

Technology Integration:

Hardware and Software Needs

SketchUp software (located in a Google folder in the applications folder).

Tips and tricks

- Teach this introductory SketchUp lesson while teaching geometry in math.
- Watch video tutorials prior to teaching students.

Resources:

Handouts or Downloads

- SketchUp 8 Quick Reference Handout

<http://dl.google.com/sketchup/gsu8/docs/en/SketchUp8RefcardMac.pdf>

Links to teaching resources

- <http://www.youtube.com/education>

Web resources

Video Tutorials

- http://www.youtube.com/watch?v=gsfH_cyXa1o
- <http://sketchup.google.com/tutorials.html>

Lesson Directions

Prep Time:

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- Familiarize yourself with SketchUp by completing the lesson.
- Photocopy technology task card (written directions).
- Plan for student access by rechecking lab (or laptop cart) for updated version of SketchUp and connectivity.

Prior to Lesson:

Teacher Prep:

- Download Quick Reference Handout. Delete the names of each tool to create a handout for students to complete.

Student Prep:

- Review geometry vocabulary

Time Needed for Lesson:

- 60 minutes

Directions:

- Introduce project. Students are to design their own clubhouse which must include the following elements:
A doorway, two windows, a column, swimming pool, a pet, and landscaping.
- Show introductory video. <http://www.youtube.com/user/SketchUpVideo?feature=watch>
- Students open SketchUp and select **Choose Templates** then **Simple Template – Feet and Inches**. They roll over each tool in the tool bar and fill in the name on their handout reference sheet. Review.
- Explain the three axes. Students will be working between the green and red axes. – Do you mean axis?
- Introduce four of the most important tools: select, pan, orbit and undo (command z). Demonstrate. Allow students to experiment with this tool.

The following steps are written for students and can be copied as a separate handout.

- Click on Susan (the figure in the program) and delete.
- Make a rectangle. Click on the rectangle tool. Click, drag, and click. Save and name your project.
- Turn the rectangle into a rectangular prism. Raise the roof. Click on the push/pull tool. Click on rectangle, drag up and click.
- Find the midline of the roof. Click on the line tool (the pencil). Drag along roofline until a blue target pops up. Click. Drag across roof to the other side until the blue target pops up. Click.
- Create a peak in the roof. Click on the move button. Click on the ridgeline and raise roof to desired height.

- Make a window on at least two sides of the structure. Click on the rectangle. Click on side of building, drag and click. Click on paint can, select **Translucent**, select a color, then click on the window.
- Make a doorway. Click on the rectangle. Click on side of building, drag and click. Press the delete key.
- Make a column. Click on circle tool. Make a small circle (you may need to use the orbit tool for better orientation). Click on the push/pull tool. Click, drag and click.
- Make a pool. Select the square, circle or arc tool. After you make the shape, click on the paint, select **Translucent**, select a color, then click on the pool.
- Decorate the clubhouse with roofing and siding material. Click on the paint can. Select the desired material and color. Click on the structure. Remember to use the orbit tool to “paint” all sides of the building.
- Add people, pets and objects. Click on the **Windows>Components**. In the pop-up box type the desired object in the search window. Click on object to download. Drag object from pop-up window and click.
- When the clubhouse is complete, click on the text tool. Write at least four text boxes to describe the unique features of your clubhouse.
- Save your project.

Extension / Challenge:

- Students can take a “tour of homes” by walking around the lab to view student projects.
- Students design their own dream house.
- Students design their own skateboard or amusement park.
- Students use Google Earth to place their structure somewhere in the world.