PRESENTED BY: girlstart

SCIENCE ★ TECHNOLOGY ★ ENGINEERING ★ MATH

3-D Design

Now that you've seen some zoos and learned about the habitat your selected animal lives in, it's time to design a zoo habitat for your animal! Explore the basic tools within SketchUp and create your own 3-D zoo habitat model.

TEKS:

3.6C Create two-dimensional figures, including circles, triangles, rectangles, and squares, as special rectangles, rhombuses, and hexagons.
5.9A Observe the way organisms live and survive in their ecosystem by interacting with the living and non-living elements.
7.10A Observe and describe how different environments, including microhabitats in schoolyards and biomes, support different varieties of organisms.

How To:

1. Start by downloading SketchUp onto your computer by going to the link below (ask permission from your parents or school before downloading software): http://www.sketchup.com/
2. Click on the red 'Download SketchUp' button. Select that you are using SketchUp for 'Personal Products' and follow the download instructions. It should take 1-2 minutes for the download to complete. Follow the steps through the set up wizard. When you finish these steps SketchUp is ready to use.
3. Now that you have SketchUp downloaded and installed, it's time to learn the basics. Click on the SketchUp icon on your desktop. When the application opens click 'Start using SketchUp'. If this is the first time you are using the application, a screen will pop up asking you to choose a template before you can begin using SketchUp.

Materials:

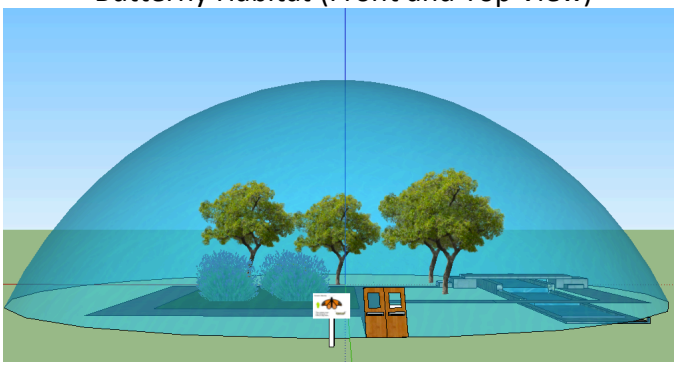
- Computer
- Mouse (not required but is easier to use SketchUp with)
- Access to the Internet (only if SketchUp isn't already downloaded)

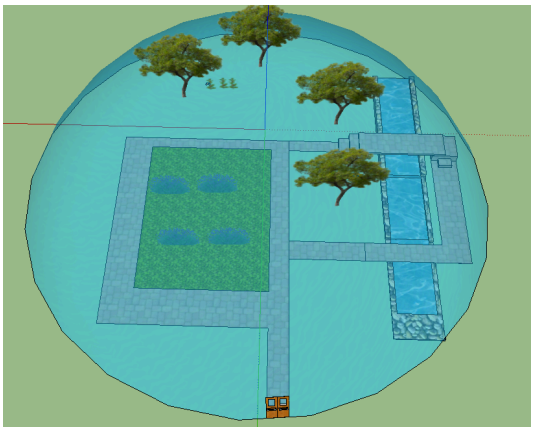
How To (continued):

4. To begin creating in SketchUp you can use the built in shape tools to create a circle , rectangle , or polygon (then click on polygon). You can also freehand your own shape by using the pencil tool ; just make sure any shape you create with the pencil tool is fully connected, otherwise SketchUp will not create a face for it. You now have a two-dimensional shape! To make it three-dimensional, use the pull/push tool . You now have a three-dimensional object. You can move or rotate a face or edge of the shape you created using the move or rotate tools. To move or rotate the whole shape you must use the select tool and select the whole shape (make sure every face and edge is highlighted blue otherwise some part will be left behind) before using the move and rotate tools. If you make a mistake and want to erase something you can use the erase tool or go to the edit menu and click undo. To change your view of your object without changing the object itself you can use the pan , orbit , and zoom tools. For more details on how to use each of the tools above you can click on the Window menu and select 'Instructor', which will open a window that will give you more information about each tool you click on.

5. Now that you know the basics to SketchUp, channel your inner zoologist and architect to design a zoo habitat. Here are a few examples Girlstart's Summer Campers created:

Butterfly Habitat (Front and Top View)





Panda Habitat (Front and Top View)

The STEM Explanation:

When designing zoo habitats, zoologists, architects, and engineers must work together to make sure that the habitat suits the animal's needs. From your research yesterday, you learned the importance of creating an environment and climate the animal is used to living in. However, before construction begins on the habitat, the architects and engineers typically design a 3-D representation of the desired environment. These 3-D plans help everyone visualize and modify the design before building has started. 3-D or 3-dimensional provides a more realistic representation of the habitat verses a 2-dimensional drawing. If we were to draw lines to connect the coordinate points on one plane, then we would have a flat, two-dimensional figure. To create a 3-dimensional shape, you use three planes with an x-, y-, and z- axis. The z-axis travels through the origin point where the x- and y-axis intersect but does so at a different angle to create a third dimension, giving an object its depth in addition to its height and width.

Career Connection:

Architects plan and design buildings for various uses. They use their scientific and mathematical knowledge of physics to understand building construction combined with their artistic abilities to design visually appealing structures. Architects are scientists, mathematicians, and artists. To become an architect you need a four-year degree and a professional degree from an architectural program.

Engineers use a coordinate system to create engineering drawings of products. When an engineer designs a part, the engineer specifies where each point on the part is located using computer software such as a Computer Aided Design program (CAD). A CAD drawing file can be sent to a machine that is designed to read the file and create the part.

Resource:

- http://www.sketchup.com/

