SketchUp FOR SCHOOLS

Lesson Plan:

TURTLE SANDBOX

Lesson for beginners · Time to complete: 45-90 mins

Build 3D shapes, add materials, and (most important!), have fun while creating a Turtle Sandbox

outline

Learning Objectives

In this lesson, students will learn how to use the following SketchUp tools:

 pan

 orbit

 zoom

 circle

 views

eraser

 offset

 push/pull

 paint

 move

 select

 scale

At the completion of this lesson, students should feel comfortable with the following on their own:

- [x] Using SketchUp for Schools' navigation tools to move around the model
- [x] Drawing circles and cylinders
- [x] Adding color and texture with SketchUp's material library

K-12 Standards

ISTE | standards for Educators

1 Learner

Educators continually improve their practice by learning from and with others and exploring proven and promising practices that leverage technology to improve student learning.

This lesson fulfills 1a, 1b

6 Facilitator

Educators facilitate learning with technology to support student achievement of the ISTE Standards for Students.

This lesson fulfills 6a, 6b, 6c, 6d

Common Core Standards

Geometry

>> Reason with shapes and their attributes

- CCSS.MATH.CONTENT.1.G.A.1
- CCSS.MATH.CONTENT.1.G.A.2
- CCSS.MATH.CONTENT.2.G.A.1

Measurement & Data

>> Describe and compare measurable attributes

- CCSS.MATH.CONTENT.K.MD.A.1

Intro to SketchUp for Schools

5 minutes

Before we get started, let's go through some of the basics together.

Getting Access

1. Go to https://edu.sketchup.com/app
2. Sign in with the Google or Microsoft email address provided by your school.

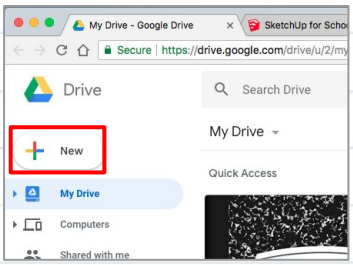
   Note: If you have trouble logging in, check with your administrator that your school or district has installed SketchUp for Schools (Instructions for Google & Microsoft Admins)

PRO TIP #1

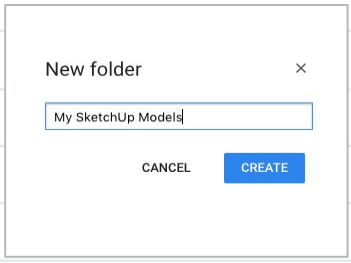
Save often!

If you get into the habit of saving your work, you'll be less likely to lose any progress if class ends and you close your laptop.

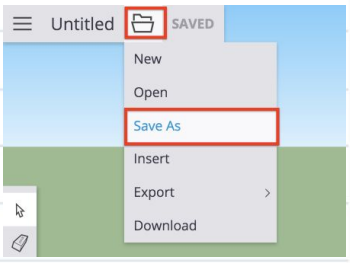
Saving Files



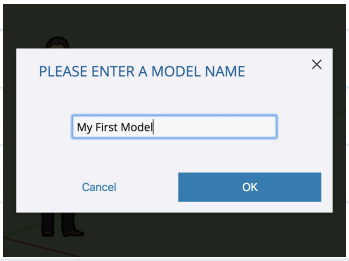
A. Before you build your first model, go to your Google Drive or Microsoft OneDrive and create a new folder.



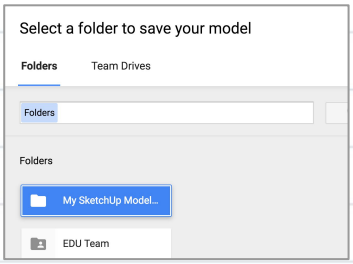
B. Give your folder a name.



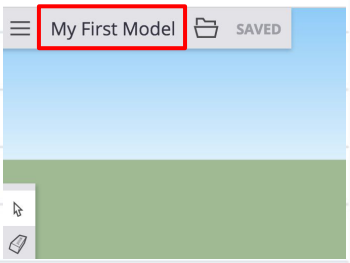
C. Whenever you start a new model, it's a good idea to save your file first. Click on the folder icon on the top left, then click 'Save As.'



D. Give your model a name, then press 'OK.'



E. Next, you'll be asked to save your model to a folder in your Google Drive or Microsoft OneDrive. Click on the folder you just created, then click 'Select.'

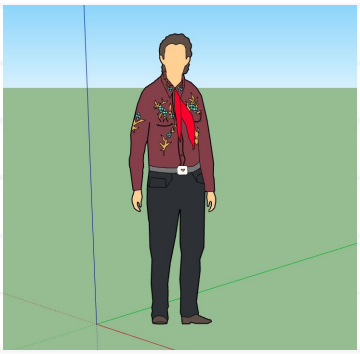


F. If you've done everything correctly, you'll see your file name in the top left corner along with a 'Saved' message.

The Scale Figure

Every time you open a new model in SketchUp for Schools, you will see Temple Grandin's scale figure. Temple's job is to give us a sense of the size of the objects we draw in our model.

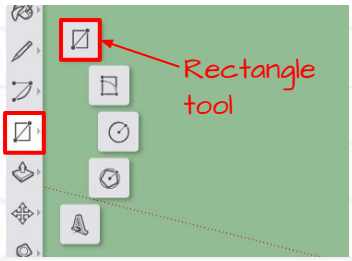
For example, Temple is 5'9". If we draw a 3 foot cube next to her, the cube will be about half her height.



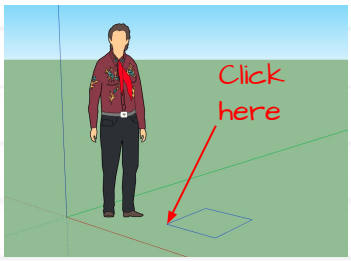
PRO TIP # 2
Unless otherwise specified, a click in SketchUp is executed as "click and release."

Drawing a Cube

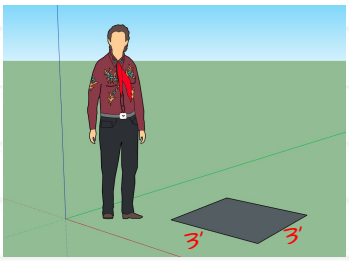
Let's test it: let's draw a 3 foot cube next to Temple.



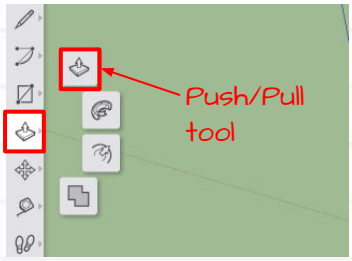
A Select the rectangle tool from the menu on the left.



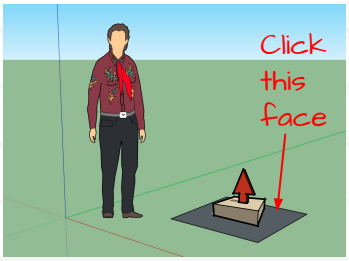
B Click once on the ground near Temple's feet to set one corner of your cube.



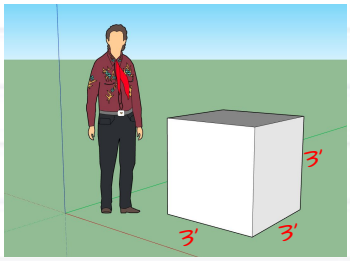
C Without clicking again, move your mouse anywhere on the screen, then type " 3', 3' ", then hit 'enter'.



D Select the push/pull tool from the menu on the left.

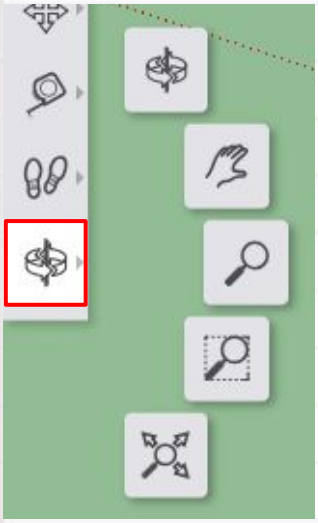


E Click once on the face you just drew. Without clicking again, move your mouse to make your cube 3D.



F Type " 3' ", then hit 'enter' to complete your cube.

PRO TIP #3
We recommend using a mouse with a scroll wheel when modeling in SketchUp. Using a trackpad is totally possible, but not as fun.



Navigation Tools

One of the most important things to learn in 3D modeling is how to move around in your model window. Click the orbit tool from the menu on the left to expand all the navigation tools.

orbit

The Orbit tool allows you to rotate around your model.
Click on the Orbit tool, then left click-hold-drag your mouse from side to side in the model window.
Mouse shortcut: hold down the scroll wheel to activate the Orbit tool, then move your mouse in any direction to orbit.

pan

The Pan tool allows you to move your model across your screen.
Click on the Pan tool, then left click-hold-drag your mouse from side to side in the model window.
Mouse shortcut: hold down the scroll wheel, then hold down the shift key at the same time. Move your mouse in any direction to pan.

zoom

The Zoom tool allows you to look closer at the details in your model.
Click on the Zoom tool, then left click-hold-drag your mouse up and down in the model window.
Mouse shortcut: use the scroll wheel to zoom in and out.

zoom window

The Zoom Window tool allows you to select an area of your model to view closer. Click on the Zoom Window tool, then left click-hold-drag your mouse to highlight an area of your model.

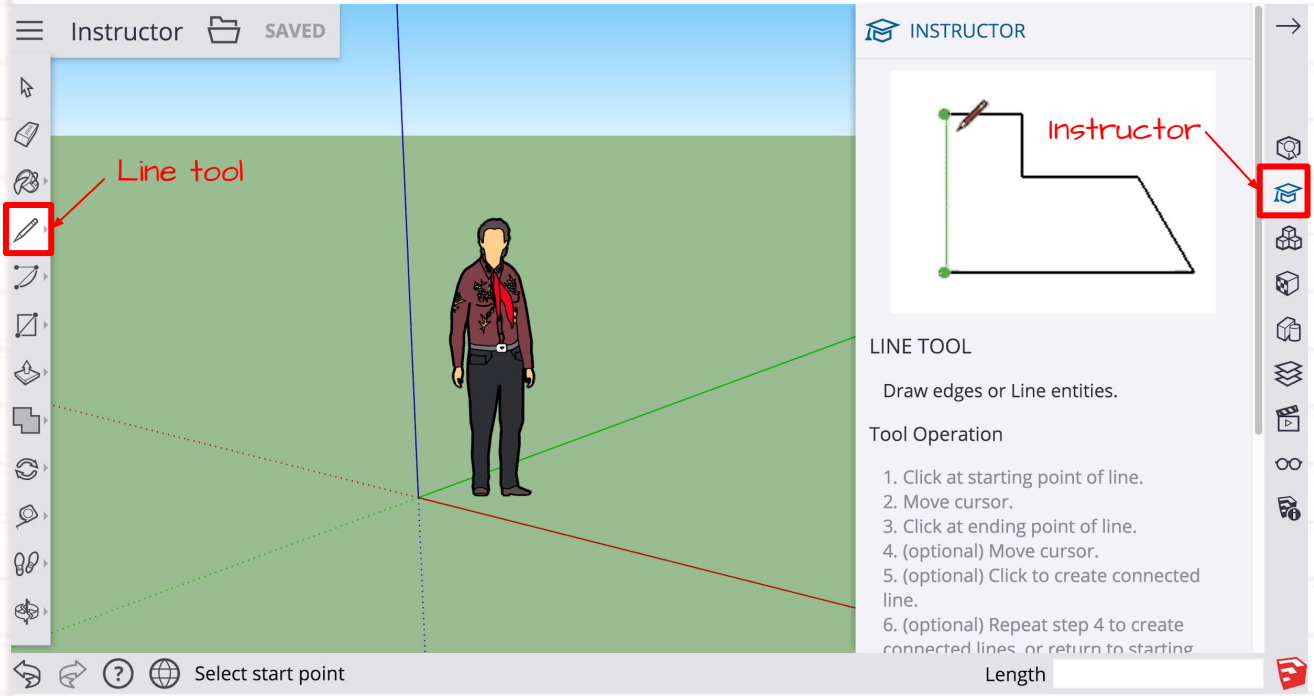
zoom extents

The Zoom Extents tool allows you to see all the geometry in your model.
Click on the Zoom Extents tool and everything in your model will come into view.

The Instructor Panel

Open the 'Instructor' from the SketchUp panels for help with understanding how to use any of SketchUp's tools.

The way it works: click on a tool with the instructor panel open and you will see a description of the tool and a step-by-step guide on how to use it.



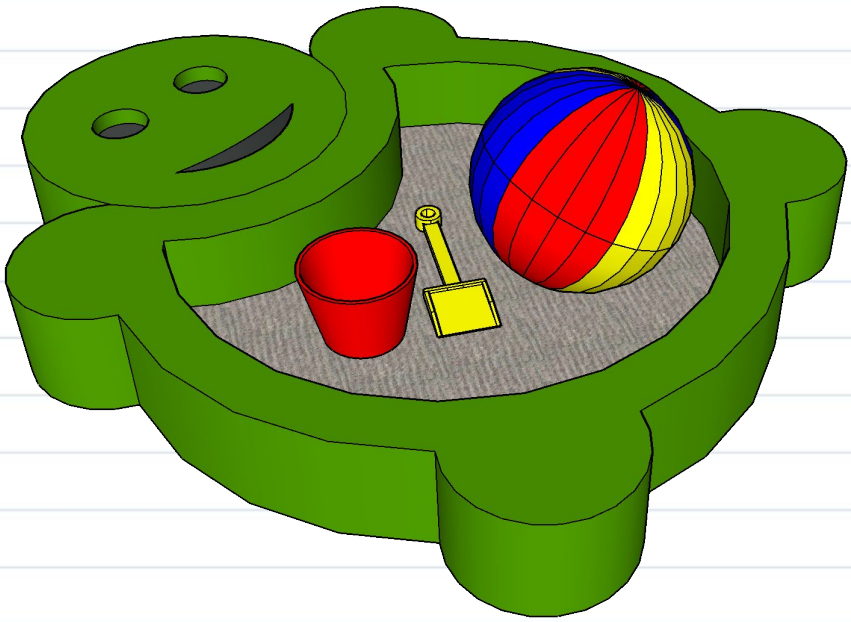
That's it for the intro.
You're ready to get started on modeling!

step-by-step tutorial:

Turtle Sandbox

pre-flight checklist

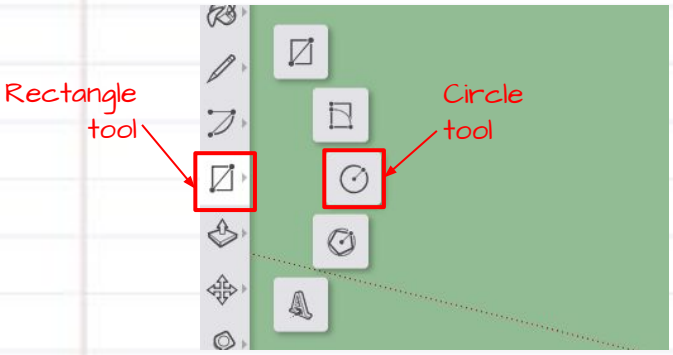
- [x] You're logged in at edu.sketchup.com/app with the Google account provided by your school.
- [x] You've setup at least one folder in Google Drive for your SketchUp models
- [x] You are super excited about making your first Turtle Sandbox!



Here's a breakdown of the steps required to complete this lesson plan:

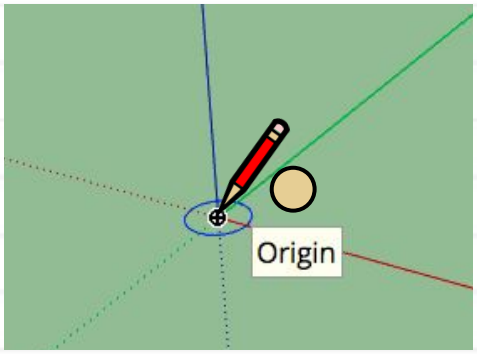
1. Draw the Turtle's body
2. Add legs and a head
3. Create the outline for the sandbox walls
4. Go from 2D to 3D
5. Add colors
6. Explore the 3D Warehouse

1 Draw the Turtle's body

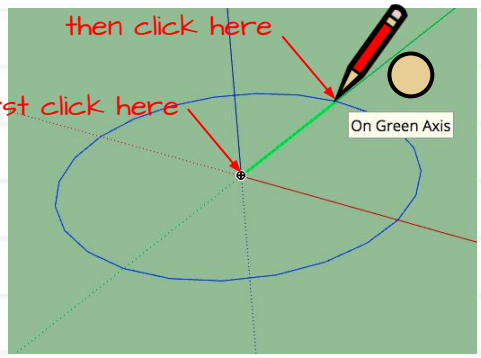


A First things first: save your file!

Now we can start drawing your turtle sandbox! Click the rectangle tool from the menu on the left to expand all the drawing tools. Then, select the circle tool.



B Bring your mouse to the point where the red, blue, and green lines meet. Each line is called an axis, and the point at which they meet is called the origin.



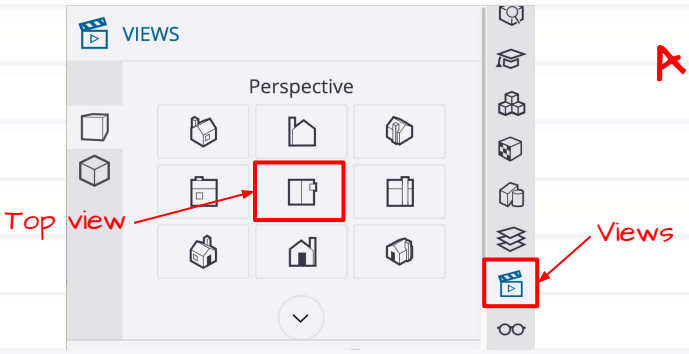
C Click once on the origin, then move your mouse along the green axis to start your circle. Click again on the green axis to complete your circle.

Uh Oh!

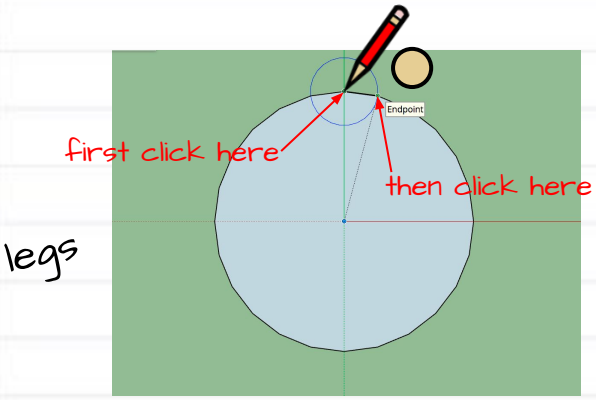
Did you mess up? No worries! Just click the undo button on the bottom left of your screen to go back. Command/control +z works, too.

undo

2 Add legs and a head

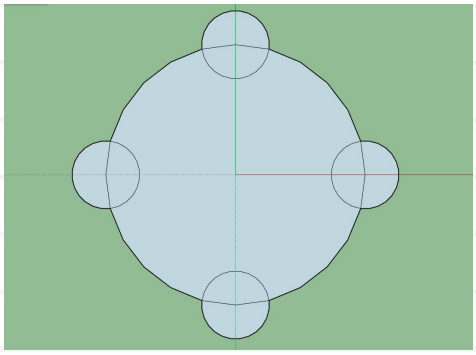


A Click on the 'Views' panel on the right, then select the top view.

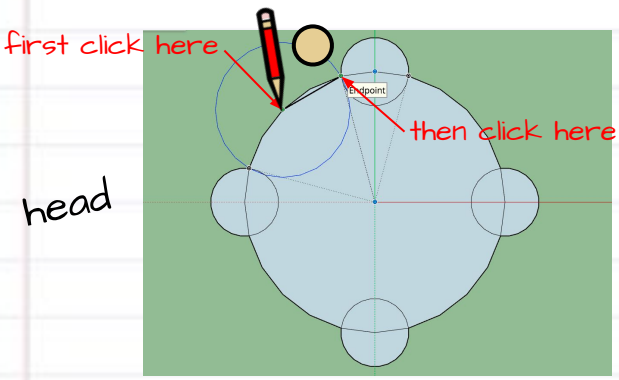


B Select the circle tool

Click once at the very top of your circle. Drag your mouse along the edge of the circle until you reach the next endpoint (you will see the word "Endpoint" once you hover over it), then click again to complete your circle.

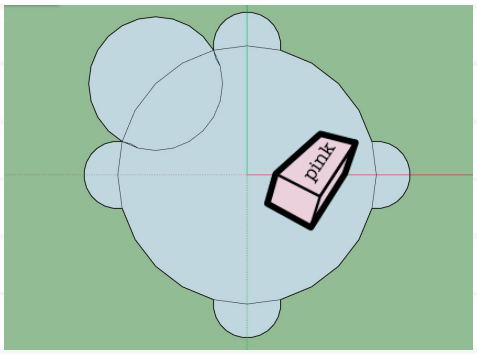


C Repeat step B at the right, bottom, and left sides of your big circle. Your turtle now has four legs.



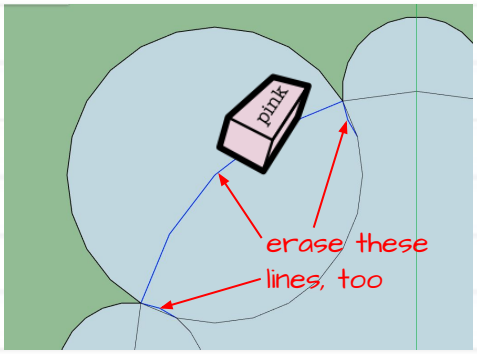
D For the head, find an endpoint on the edge of the big circle (the body) that is right in the middle of two smaller circles (the legs), then click once. To complete the head, click again on the edge of one of the smaller circles.

3 Create the outline for the sandbox walls



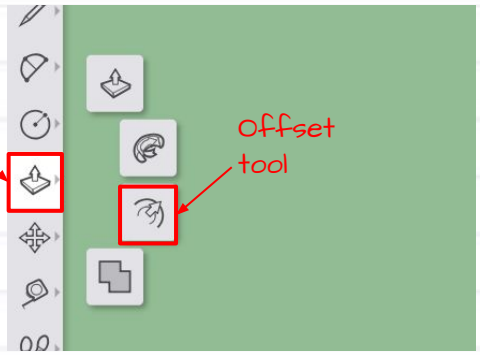
A Select the eraser tool  from the menu on the left.

Click once on a line to delete it. You want to delete all of the lines from the smaller circles (the legs) that are inside the biggest circle (the body).

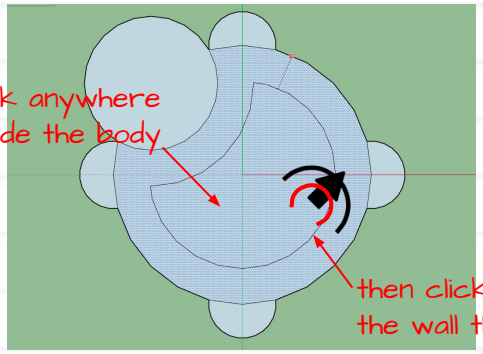


B Zoom in and erase all the lines inside the head as well.

Tip: check out this page for info on how to zoom.



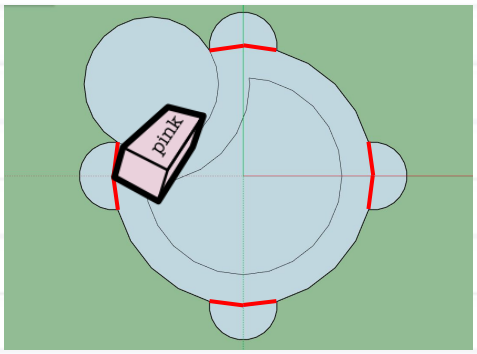
C Click the push/pull tool from the menu on the left to expand all the tools in the flyout. Then, select the offset tool.



D Move your mouse anywhere inside the turtle's body, then click once to start the offset. Click again to set the offset.

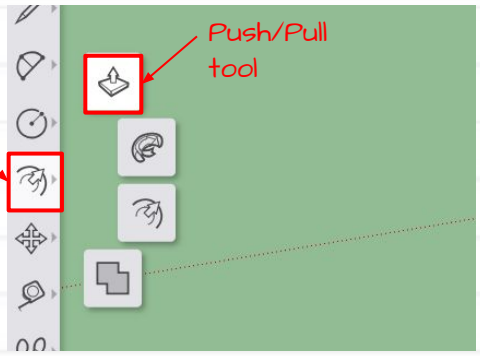
Tip: In this step, you are setting the thickness of your sandbox walls. Make sure your offset lines aren't too far (super-thick walls) or too close (super-thin walls) to the original lines. Don't forget about the undo tool if you need to try again!

4 Go from 2D to 3D



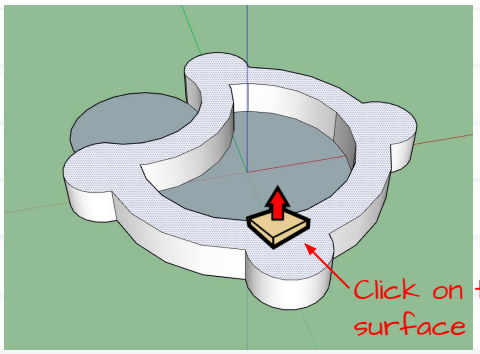
A Select the eraser tool  from the menu on the left.

We are going to make our sandbox walls 3-Dimensional! First, let's erase the lines inside the turtle's legs (highlighted in red in the image).

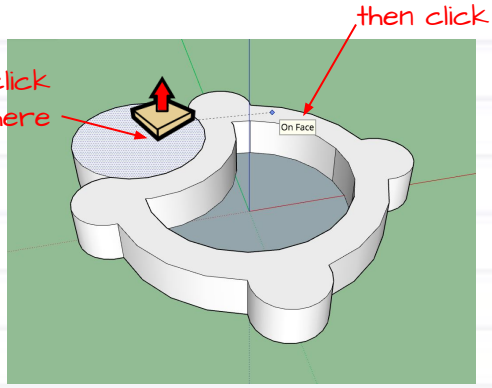


B First, orbit to a 3D view  Then, click the offset tool from the menu on the left to expand all the tools in the flyout. Select the push/pull tool.

Tip: check out this page for more info on orbiting.

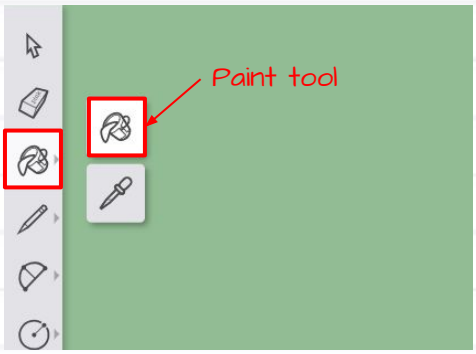


C Click anywhere on the sandbox walls to make your model 3D. Click again to set the height of your sandbox walls.

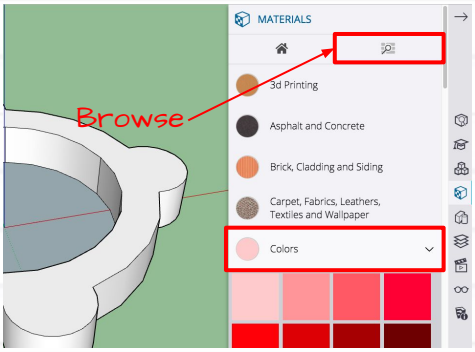


D To match the height of the head with the height of the walls, click once on the head, then click again on the top of the sandbox walls.

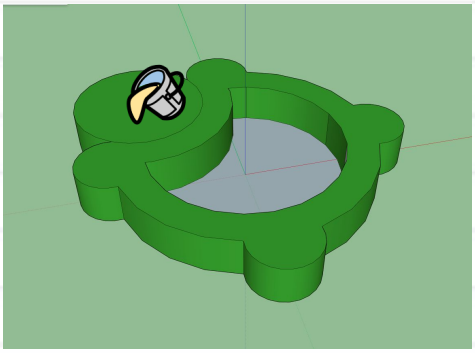
5 Add colors



A Select the paint tool from the menu on the left.

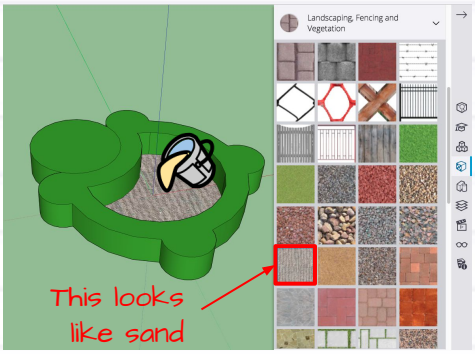


B The materials panel will automatically open on the right side and a few default colors will appear. Click the magnifying glass to browse the material library, then click on 'Colors'. Search for your favorite color for your turtle sandbox and click on it.



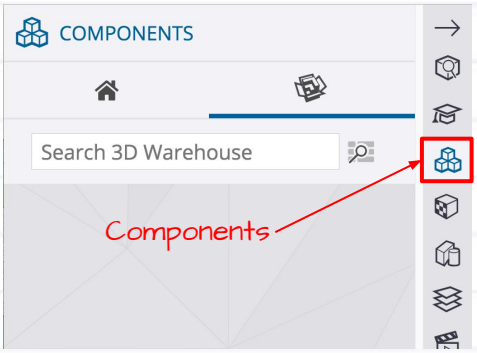
C Click on all the faces that you want colored.

Tip: make sure to orbit around your model to get the faces on the back and bottom, too. Check out this page for more info on orbiting.

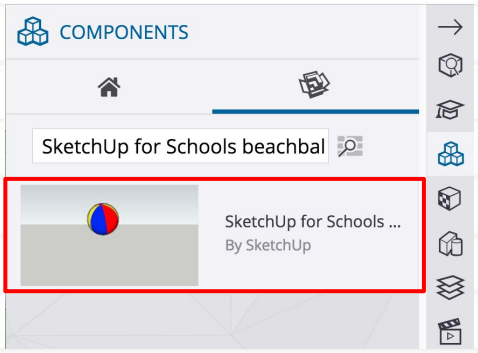


D Go back to the materials library and look for the category 'Landscaping, Fencing and Vegetation'. Select a material for your sand, then click on the surface inside your turtle's belly.

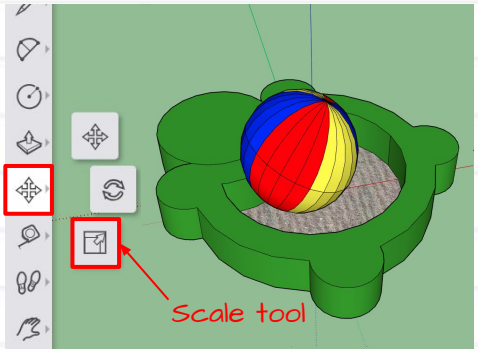
6 Explore the 3D Warehouse



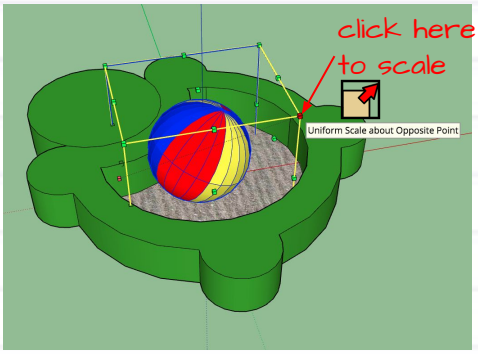
A Now that your sandbox is complete, let's jazz it up with some fun models from SketchUp's 3D Warehouse. First, click the 'Components' panel on the right.



B Type "SketchUp for Schools beachball" in the search window. Click on the beach ball created by SketchUp, then click inside your sandbox to place the beachball.

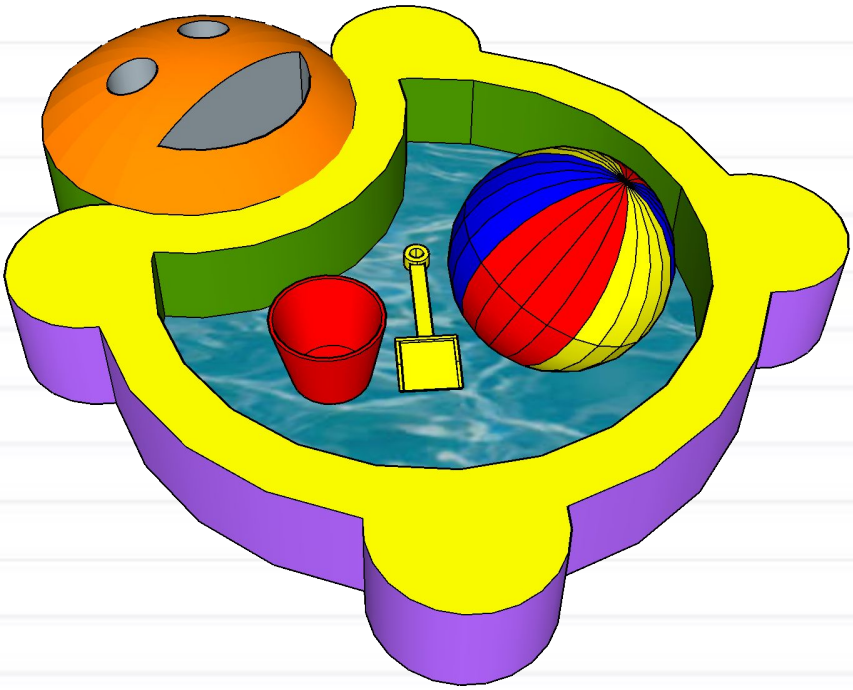


C If the beachball is too big for your sandbox, click the move tool from the menu on the left to expand all the tools in the flyout. Then, select the scale tool.



D Select the beach ball, then click on one of the corner grips to scale it. Click again to set the size of your beachball.

That's it, you're done! Have fun with your new SketchUp skills and look out for more tutorials from SketchUp.



Make your turtle sandbox your own by adding colors and more models from SketchUp's 3D Warehouse!