SketchUp
FOR SCHOOLS

Lesson Plan:

TURTLE SANDBOX

Lesson for levels K-5 ● **Time to complete: 45-90 min**

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TURTLE SANDBOX

Level: Grades K-5 (ages 5-10)
Time to complete: ~45-90 minutes

**Learn how to build basic geometry,
apply materials, and import models from
SketchUp's 3D Warehouse while building a
Turtle Sandbox**

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lesson summary

In this lesson, students will become comfortable with basic 3D modeling in SketchUp for Schools. As students work to build their turtle sandbox, they will gain exposure to 3D modeling lingo, learn how to create 3D shapes, and add colors from SketchUp's material library. They have the freedom to add in their own personal touches by importing models from the extensive SketchUp 3D Warehouse: an online repository of millions of 3D models created by our users.

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

✔ Using SketchUp for Schools' navigation tools to move around the model

✔ Creating cubes and cylinders

✔ Undoing or deleting mistakes

ISTE standards

empowered professional

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.

a. Set professional learning goals to explore and apply pedagogical approaches made possible by technology and reflect on their effectiveness.

b. Pursue professional interests by creating and actively participating in local and global learning networks.

c. Stay current with research that supports improved student learning outcomes, including findings from the learning sciences.

learning catalyst

5. designer

Educators design authentic, learner-driven activities and environments that recognize and accommodate learner variability.

a. Use technology to create, adapt and personalize learning experiences that foster independent learning and accommodate learner differences and needs.

b. Design authentic learning activities that align with content area standards and use digital tools and resources to maximize active, deep learning.

c. Explore and apply instructional design principles to create innovative digital learning environments that engage and support learning.

learning objectives

Students will identify, select, and manipulate the following SketchUp tools:

select	rectangle	scale	materials	offset
pan	line	move	view	eraser
zoom	circle	paint	orbit	push/pull

Teacher Preparation

✔ Watch and follow along to the Introduction to SketchUp for Schools tutorial, a prerequisite for all SketchUp for Schools curriculum.

✔ Make sure each student has their own Google login.

✔ Make sure SketchUp for Schools is deployed in your Google School. For more information, visit https://www.sketchup.com/education/sketchup-for-schools or speak with your School's administrator.

✔ Headphones are needed for the video tutorial that accompanies this lesson.

"Most CAD software is intimidating and takes months if not years to learn, but I have found my students can become skilled in SketchUp in a week."

- Mike Hathorn

Introduction to SketchUp for Schools
5 minutes

The Scale Model

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

For example: Mike is 5'10", so if we draw a 3 foot x 3 foot x 3 foot box next to him, it will be about half his height.
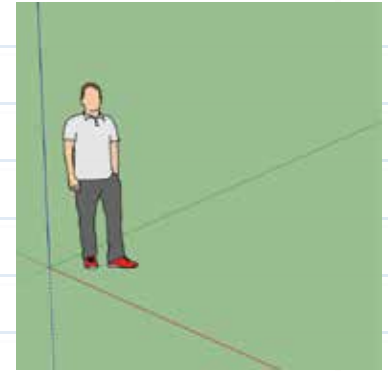

Figure 1

Drawing a Box

Let's test it; let's draw a 3 foot x 3 foot x 3 foot box next to Mike.

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

b. Click once on the ground near Mike's feet to set one corner of your box. You should be able to move your mouse around and vary the size of the square at this point.

c. Type 3',3' and hit enter to complete the square. Note that the dimensions you type will appear in the bottom right-hand corner of your screen.

d. Select the push pull tool to make the box 3D.

e. Hover over the square to select it as the surface to extrude. Click once and move your mouse up. You should be able to move your mouse up and down to vary the height of the box at this point.
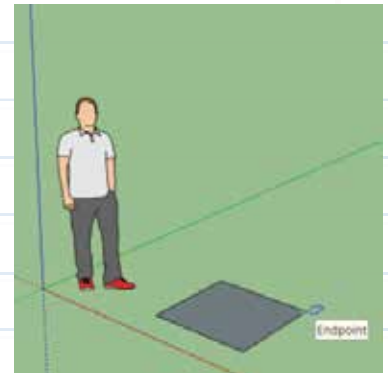
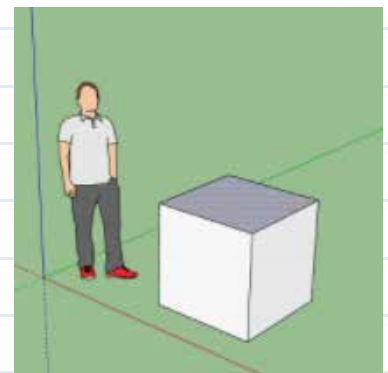f. Type 3' and hit enter to complete the box.

Figure 2

Pro tip! The Instructor Panel

Open the 'Instructor' from the SketchUp panels if you need help 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.

Figure 3

Navigation Tools

One of the most important things to learn in 3D modeling is how to move around in your model window. You can click on the orbit tool to expand all the navigation tools in the menu.
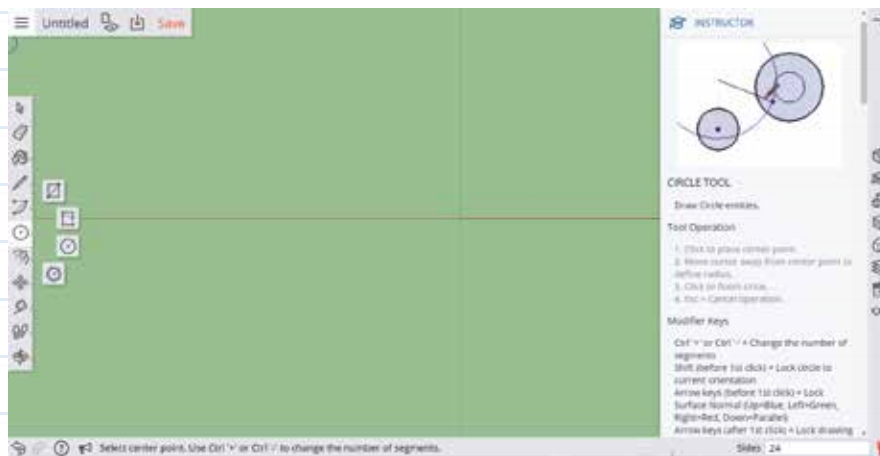
Click on the orbit tool , then left click-hold-drag your mouse from side to side. You should see Mike and the box you built rotating back and forth on the screen. If you click-hold-drag-release, then repeat, you will be able to spin around your box.

Click on the pan tool , then click-hold-drag your mouse from side to side. You should see Mike and the box you built moving from side to side on the screen.

Click on the zoom tool , then click-hold-drag your mouse from top to bottom. You should see Mike and the box you built moving closer and farther on the screen.
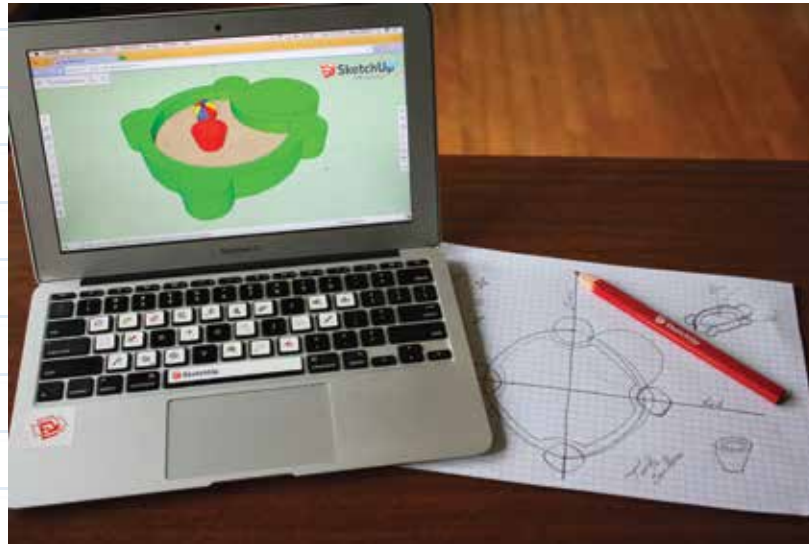
Click on the zoom window tool, then click-drag-release to create a window around Mike and the box you built. Your model will zoom to fit the window you drew.

Click on the zoom extents tools to fit Mike and the box you drew in your model window.
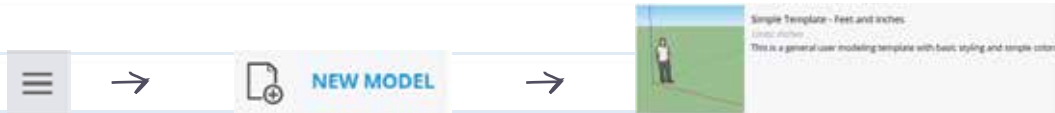
Turtle Sandbox Tutorial

Now that you've gone through the introduction to SketchUp for Schools, you are ready to start modeling your turtle sandbox!

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

1. Make the body
2. The legs and the head
3. Make the walls
4. Make your model 3D
5. Add your colors
6. Add the sand
7. 3D Warehouse fun

① Make the body

a. open a new model

☰ → NEW MODEL →

Simple Template - Feet and Inches

This is a general user modeling template with basic styling and simple colors.

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b. Click the select tool , click on Mike, then
delete him from the view.

→ → Delete

---

c. Click on the rectangle tool to expand all the draw tools
in the menu.

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d. Select the circle tool.

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e. Bring your circle tool to the point where the red,
green, and blue lines meet. Each line is called an
axis, and the point at which they meet is called the
origin. You will know you are at the origin because
you will see the word "origin" appear on the screen.

Origin

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f. Click once on the origin, then release and drag your
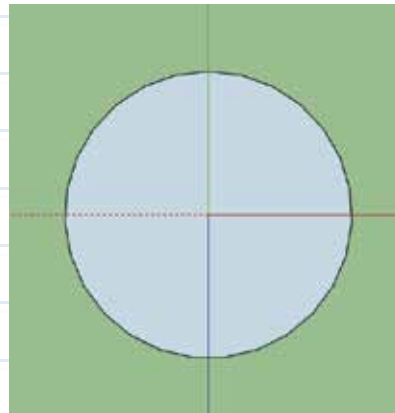mouse along the green axis to start your circle.

On Green Axis

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g. Type 36" and hit enter to complete the circle . Note that the dimensions you type
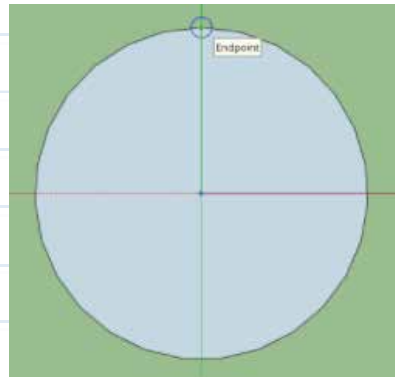will appear in the bottom right-hand corner of your screen

Radius 36" →

The circle you just drew will be the body of your turtle sandbox!
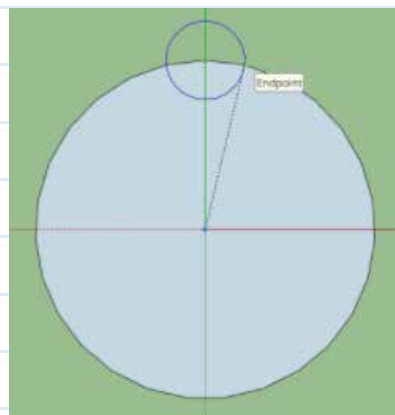
② The legs and the head

a. Click on the views panel and select the top view

- -

b. Select the circle tool ⊘ , then click once at the very top of the circle where the green axis intersects with the circle's edge.
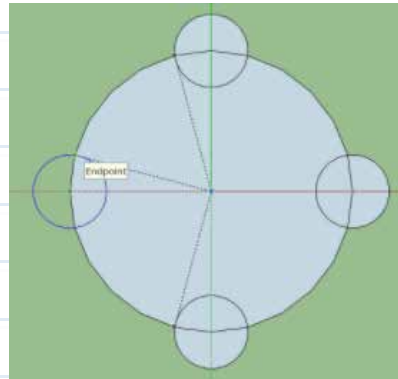

- -

c. Drag your mouse to the right along the edge of the circle until you reach the next endpoint. Click to complete the smaller circle.

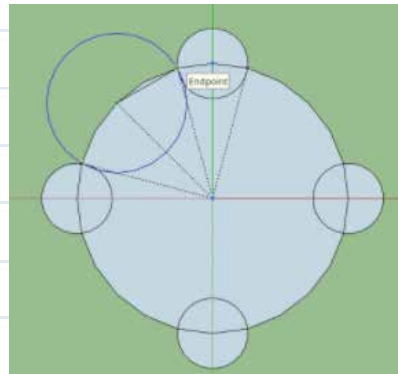- -

✦ Keep going! This lesson continues →

2 The legs and the head

**d.** Repeat steps B and C at the right, bottom, and left sides of the circle.

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e. Select the circle tool ⊘ again and find the endpoint right in the middle of two smaller circles.

Click-release-drag your mouse from the middle endpoint to the edge of one of the smaller circles. Click to complete the larger circle.

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f. Drag your mouse to the right along the edge of the circle until you reach the next endpoint. Click to complete the smaller circle.
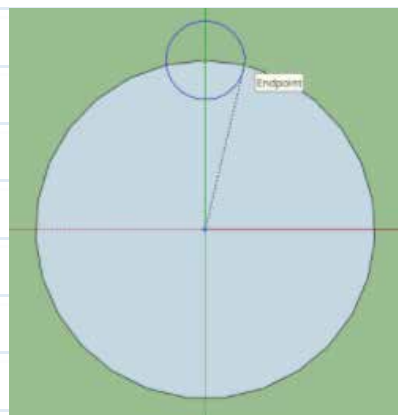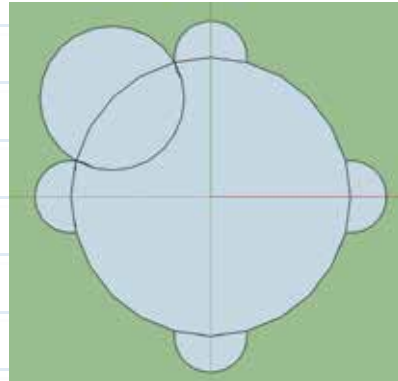

✦ The smaller circles are the Turtle's legs and the larger circle will be its head!
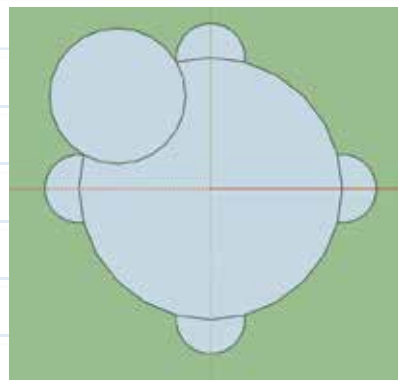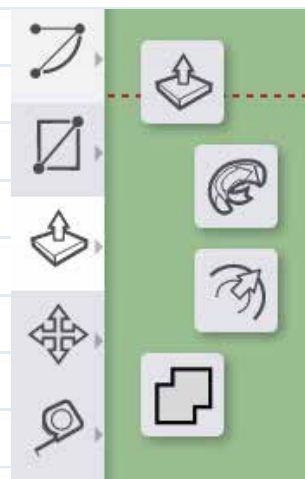
③ Make the walls

a. Select the eraser tool.

- -

b. Click on the inside half of the the smaller circles to erase them.

- -

c. Erase all lines inside the large circle.

- -

d. Click on the push/pull tool to expand all the draw tools in the menu.

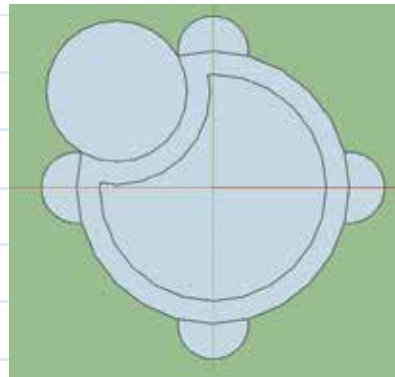- -

③ Make the walls

e. Click on the offset tool 🖱. The offset tool creates copies of lines at a uniform distance from the original.

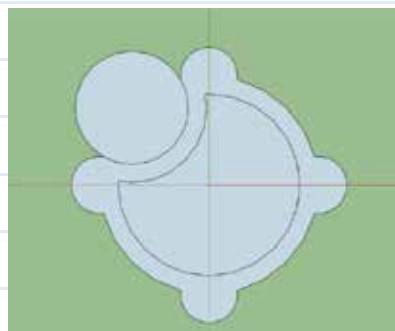- -

f. With the offset tool active, hold your mouse over the middle of your largest circle (the body) so that it is highlighted.

- -
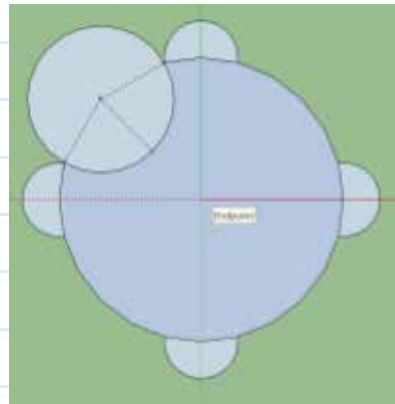
g. Click once inside the body, then type 6" and hit enter.

- -

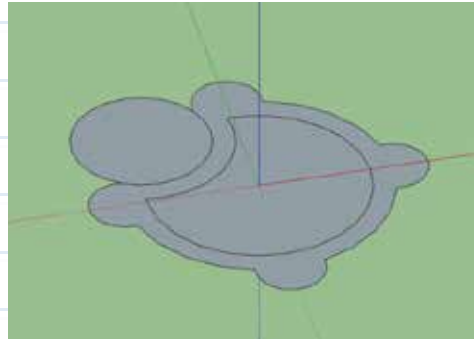**h.** Select the eraser tool 🖊 and delete the lines between the legs and the outer ring you just created.

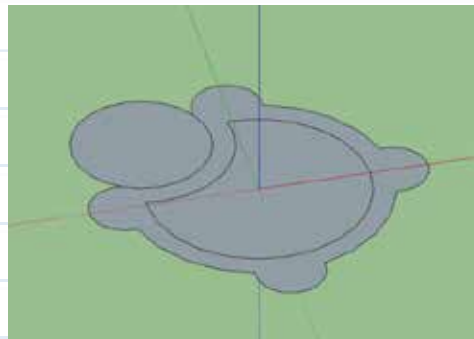⭐ You have just made the walls of your sandbox!

- -

4 **Make your model 3D**

a. Select the orbit tool ⬙ and left click-hold-drag your mouse to view your model in 3D again.
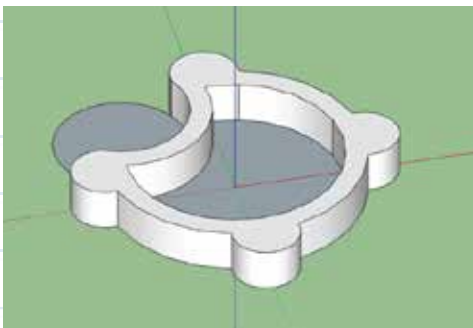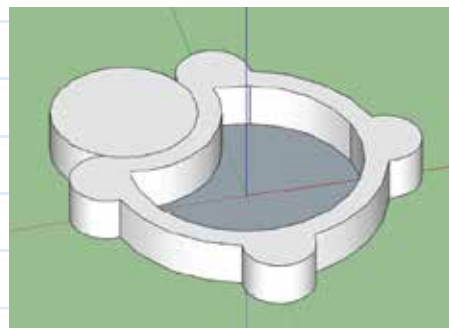

b. Select the push/pull tool ⬙

c. With the push/pull tool active, hold your mouse over the outer ring of walls you just created so that they are highlighted.

d. Click once, and then slide your mouse up the screen. Type 12" and hit enter to create the 3D walls.
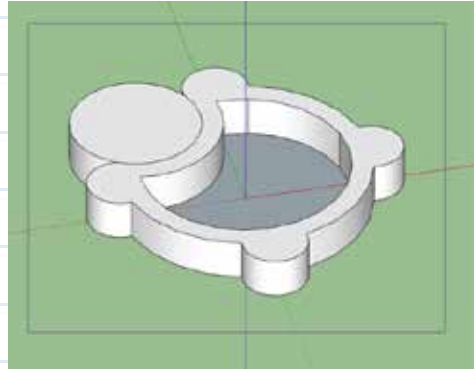

e. Repeat step D with the Turtle's head.

⑤ Make your model 3D

a. Click on the select icon. ⌖

- -

b. Select all surfaces by either triple-clicking on the sandbox model, or dragging a window from the top left of the model to the bottom right.

When all surfaces are selected, your model will look like this:

- -
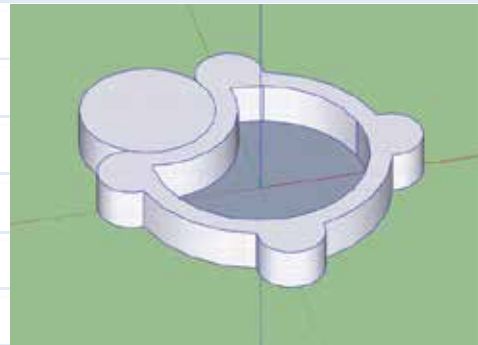
c. Select the paint tool 🖌

- -

d. The materials panel will automatically open on the right side of the screen. Select browse, and then 'Colors'

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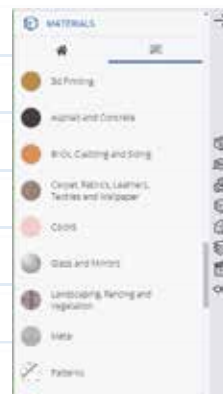
⑤ Make your model 3D

e. Scroll down in the colors menu to find a color for your sandbox. Once you find the perfect color, select it by clicking on the swatch box.

- -

e. Click anywhere on your model to apply the color you selected to all surfaces.

- -
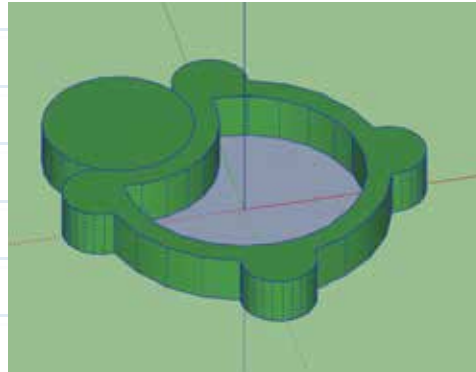
✦ Keep going! This lesson continues →

⑥ Add the sand

a. Select the push/pull tool

- -

b. With the push/pull tool active, hold your mouse over the "belly" of your turtle sandbox.

- -
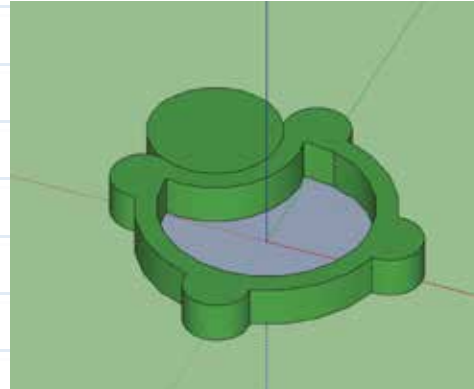
c. Click once, and then slide your mouse up the screen. Type 6" and hit enter to create the sand.

- -
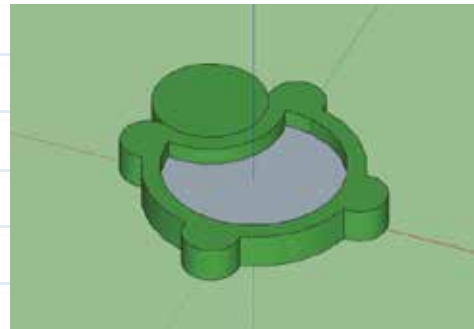
d. Select the paint tool

- -

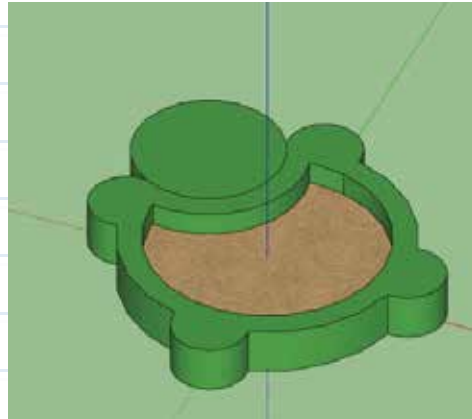**e.** The materials panel will automatically open on the right side of the screen. Select browse, and then 'Landscaping, Fencing and Vegetation' and choose an option that looks like sand.

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6 Add the sand

f. Click anywhere on the belly of your turtle to apply the sand material.

- -
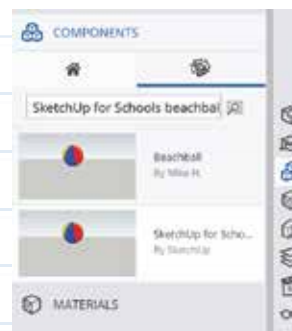
✸ This lesson has one more step! Let's go! →

⑦ 3D Warehouse fun

✦ Now that your sandbox is complete, let's add some fun models from SketchUp's 3D Warehouse to jazz it up.

- -

a. Click on the components tab in the right hand toolbar.

- -

b. Type "SketchUp for Schools beachball" in the search window, and select the beachball created by SketchUp.

- -

c. Move your cursor over your turtle sandbox and click to place the beachball.

- -

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

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