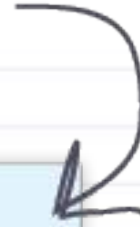# SketchUp
FOR SCHOOLS

Lesson Plan:

PIRATE SHIP PLAYHOUSE

Intermediate lesson · Time to complete: 1-2 hours

Learn about SketchUp's draw tools, materials library, and 3D Warehouse, while making your very own Pirate Ship Playhouse.

outline

Learning Objectives

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

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

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

- ✔ Creating cubes, cylinders, pyramids, and gable roofs

- ✔ Additive and subtractive modeling

- ✔ 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

4 Collaborator

Educators dedicate time to collaborate with both colleagues and students to improve practice, discover and share resources and ideas, and solve problems.

This lesson fulfills 4b, 4c

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

>> Solve real-world mathematical problems involving area, surface area, and volume.
  - CCSS.MATH.CONTENT.6.G.A.3

>> Draw, construct, and describe geometrical figures and describe the relationships between them.
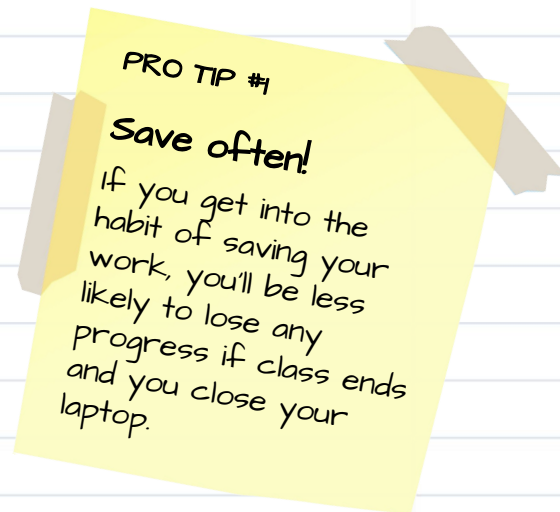 - CCSS.MATH.CONTENT.7.G.A.2

Intro to SketchUp for Schools

5 minutes

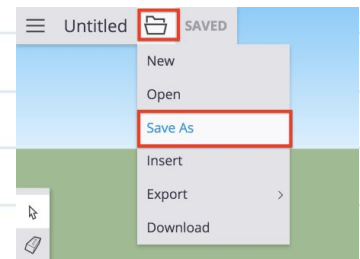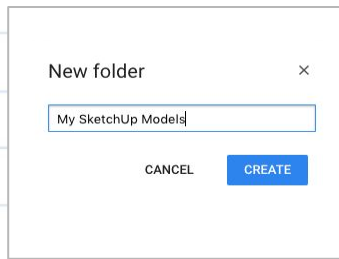Before we get started, let's go through some of the basics together.

Getting Access

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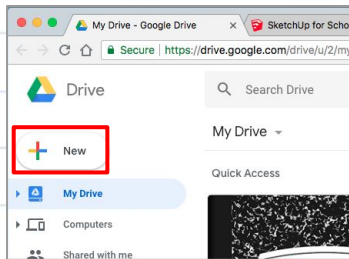
2 Sign in with the Google or Microsoft email address provided by your school.

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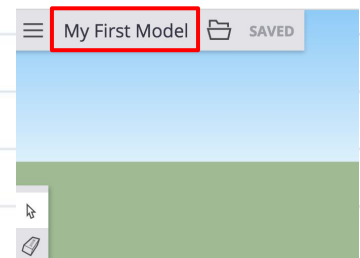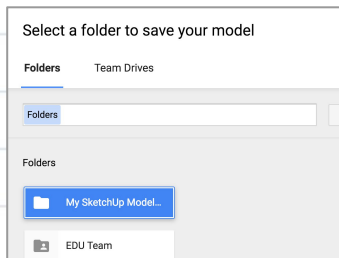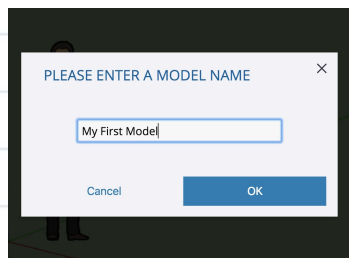
D Give your model a name, then press 'OK.'

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.
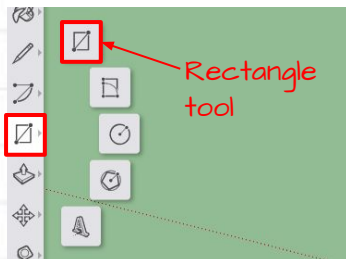
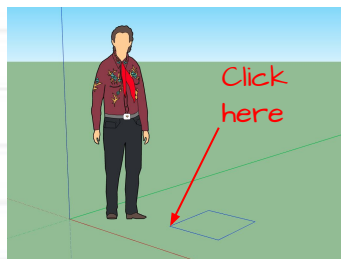For example, Temple is 5'9". If we draw a 3 foot cube next to her, the cube will be about half her height.
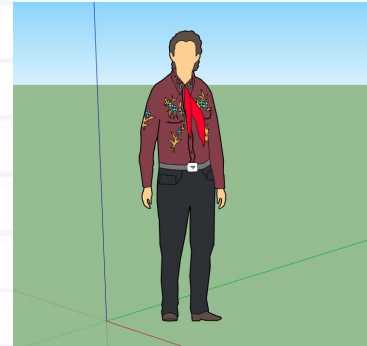
PRO TIP # 2
Unless otherwise specified, a click in SketchUp is executed as "click and release."
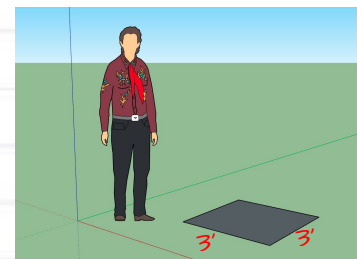
Drawing a Cube

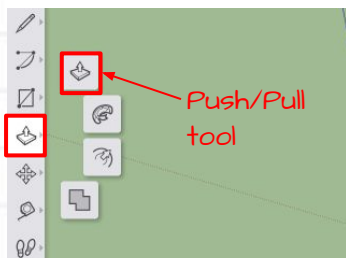Let's test it: let's draw a 3 foot cube next to Temple.

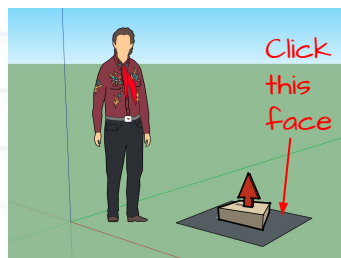**A** Select the rectangle tool from the menu on the left.

Rectangle tool

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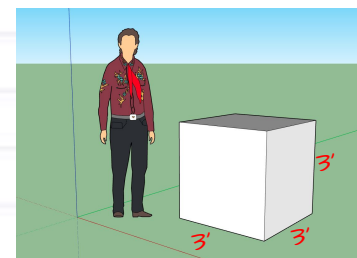
Click here

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

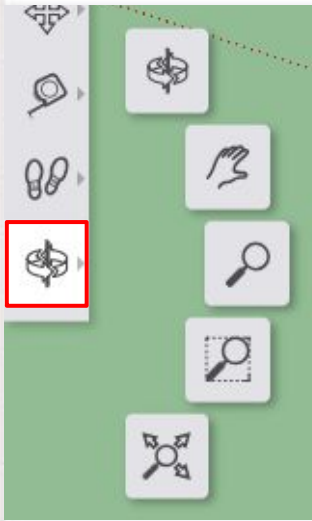**D** Select the push/pull tool from the menu on the left.

Push/Pull tool

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

Click this face

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

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.
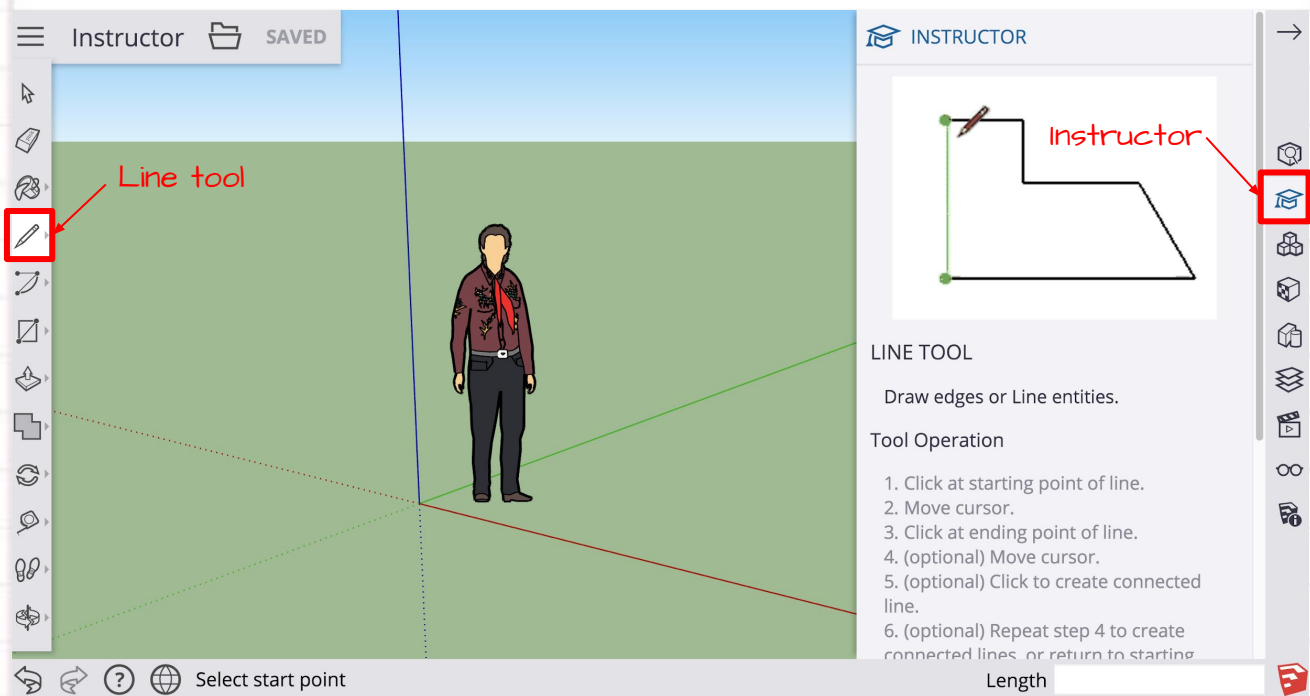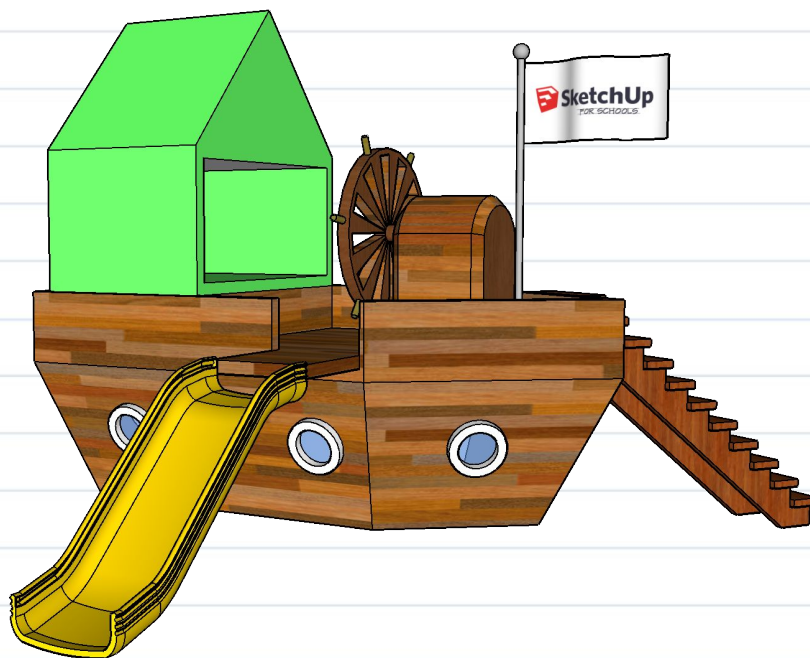

⭐ That's it for the intro.
You're ready to get started on modeling!

step-by-step tutorial:

Pirate Ship Playhouse

Pre-flight checklist

☑ You're logged in at edu.sketchup.com/app with the Google account provided by your school.

☑ You've setup at least one folder in Google Drive for your SketchUp models

☑ You are super excited about making a Pirate Ship Playhouse!

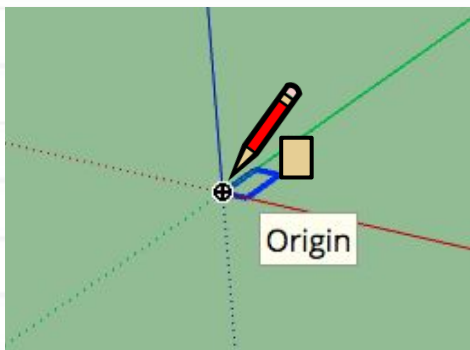Here's a breakdown of the steps required to complete this lesson plan:

1. Ship Shape

2. The Hull

3. The Deck

4. The Cabin

5. The Portholes

6. The Plank

7. Customize your ship: materials & the 3D Warehouse

1 Ship Shape
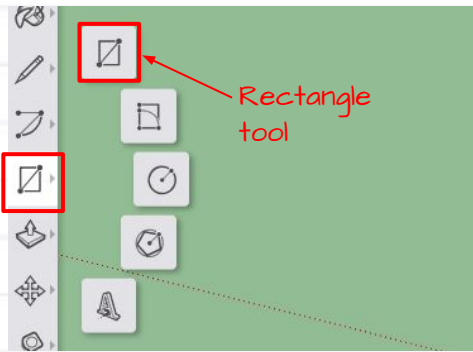
Rectangle tool

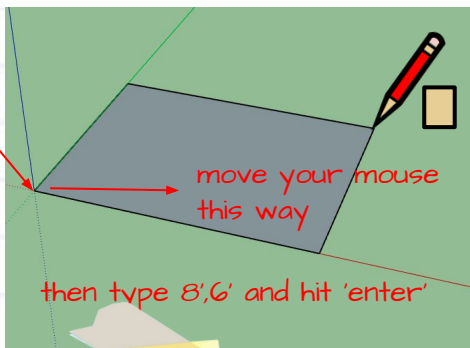**A** First things first: save your file!

Now we can start drawing your pirate ship! Select the rectangle tool from the menu on the left.

Origin

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.

first click here

move your mouse this way

then type 8',6' and hit 'enter'

C Click once on the origin, then move your mouse to the right to start your rectangle. Without clicking again, type " 8', 6' ", then hit 'enter' to complete your rectangle.
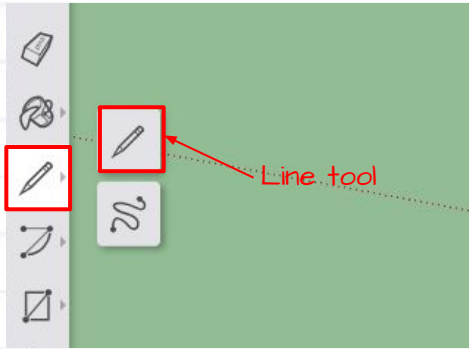
PRO TIP #4
When you type in measurements, they will appear in the bottom right-hand corner of your screen in the 'Dimensions' box. No need to click into the box to type though -- simply type anywhere on the screen!
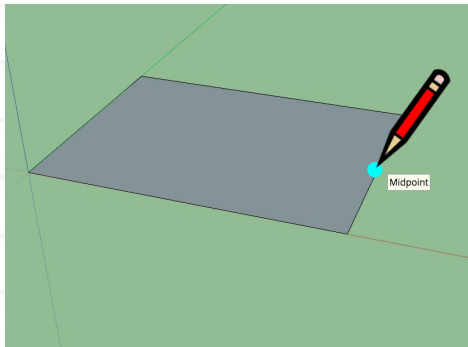
Dimensions 8',6'

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.
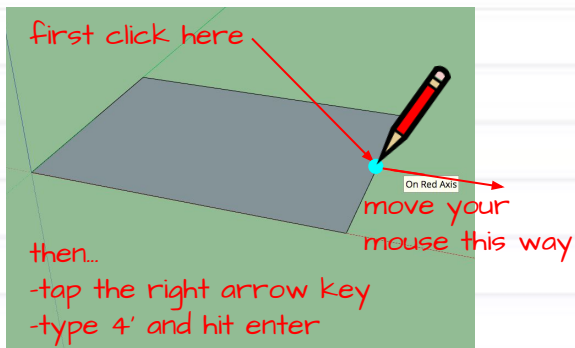
undo

Line tool

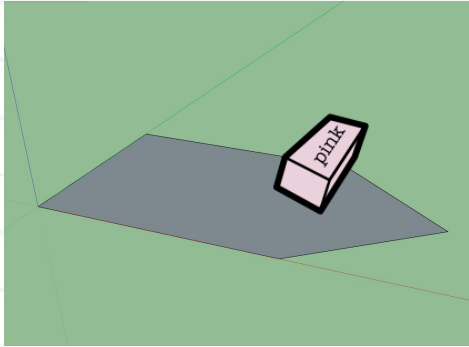**D** Click the line tool from the menu on the left.

Midpoint

E Find the midpoint on the short side of your rectangle. The midpoint is represented by a cyan dot and will say "Midpoint" when you hover over it.

first click here

On Red Axis

move your mouse this way

then...
-tap the right arrow key
-type 4' and hit enter

F Click once on the midpoint. Without clicking again, move your mouse to the right, then tap the right (→) arrow key to lock your line to the red axis. Next, type "4'", then hit enter to complete your line.
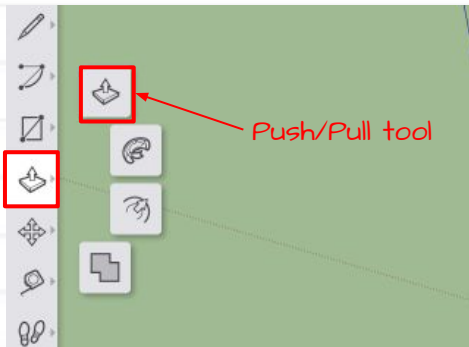
then click here

Endpoint

first click here
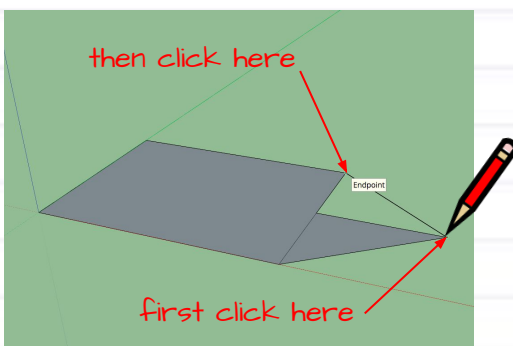
G With the line tool still selected, click once on the end of the line you just created, then click on one of the near corners of the rectangle. You should now have a triangle surface adjacent to your rectangle. Repeat on the other side.
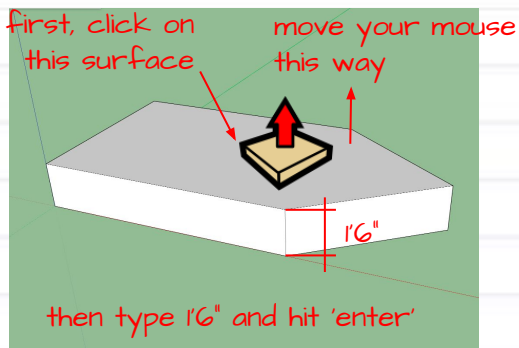
H Select the eraser tool from the menu on the left.

Click once on a line to delete it. You want to delete all the lines inside the shape.

Push/Pull tool

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

first, click on this surface

move your mouse this way

1'6"

then type 1'6" and hit 'enter'

J Click anywhere on the surface to extrude it in 3D. Without clicking again, move your mouse up on the screen, then type " 1'6" ", then hit enter to complete the extrusion.
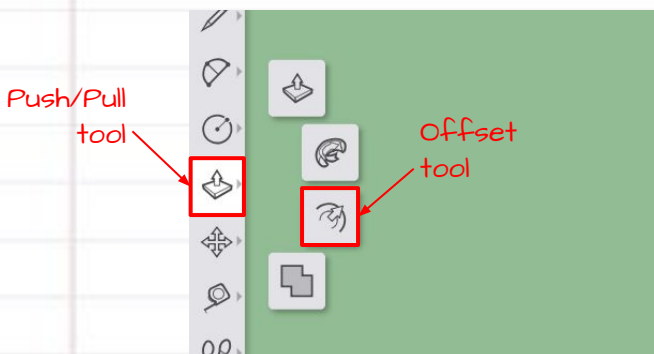
☆ Keep going! This lesson continues ⟶

2 The Hull
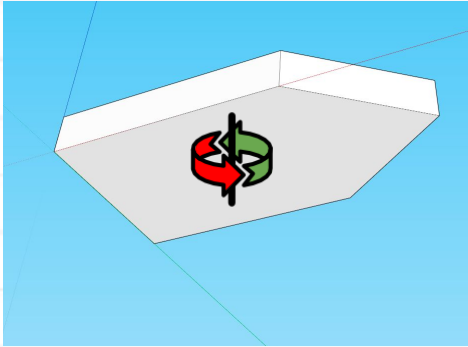
A Orbit to the underside of the geometry you just created.

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


Push/Pull tool

Offset tool

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

The offset tool will create copies of your lines at a uniform distance from the original.
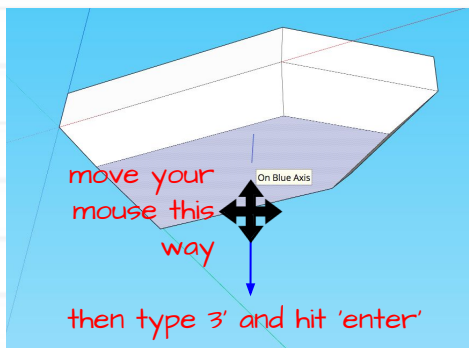

first click here

On Edge

move your mouse this way

then type 1' and hit 'enter'
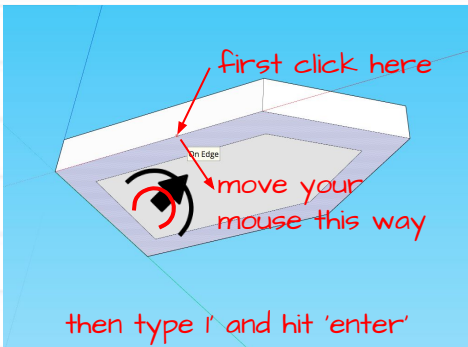
C Click on any edge of the bottom surface and, without clicking again, move your mouse towards the center of the shape. Type "1", then hit enter to complete the offset.

Move tool

D Select the move tool from the menu on the left.

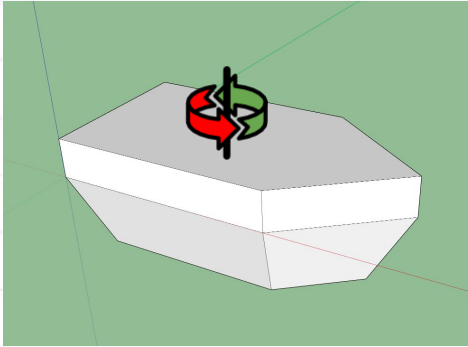click on this
surface

On Face
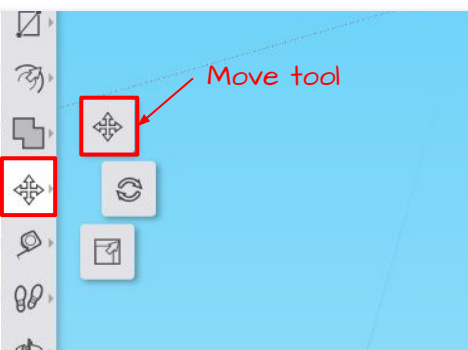
then tap the up arrow key
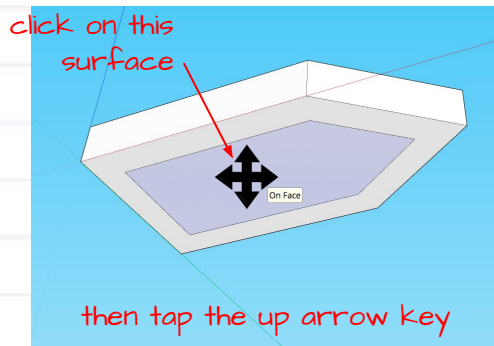
E Hold your mouse over the inset surface so that it is highlighted, then click once on the surface. Tap the up (↑) arrow key to lock your translation to the blue axis.

move your
mouse this
way

On Blue Axis

then type 3' and hit 'enter'

F Without clicking again, move your mouse down on the screen. Next, type "3'", then hit enter to complete your geometry.
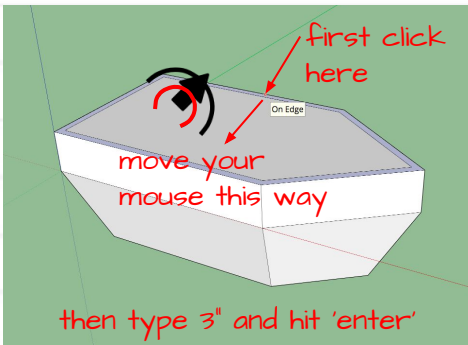
☆ Keep going! This lesson continues ⟶

(3) The Deck

A Orbit back to the top of your model.

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

first click here

move your mouse this way
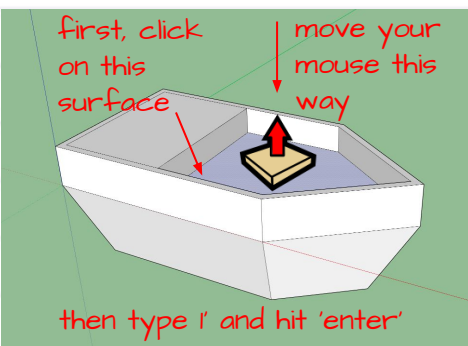
On Edge

then type 3" and hit 'enter'

B Select the offset tool from the menu on the left.

Click on any edge of the top surface and, without clicking again, move your mouse towards the center of the shape. Type "3"", then hit enter to complete the offset.

then click here

first click here
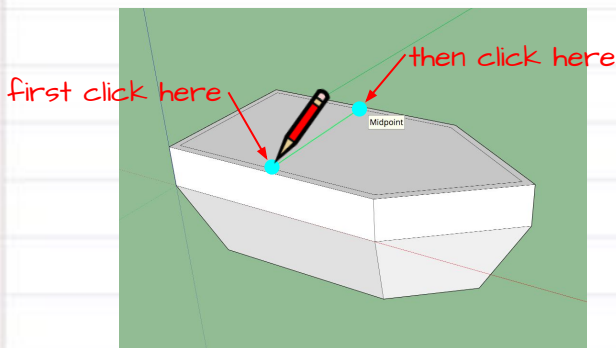
Midpoint

C Select the line tool from the menu on the left.
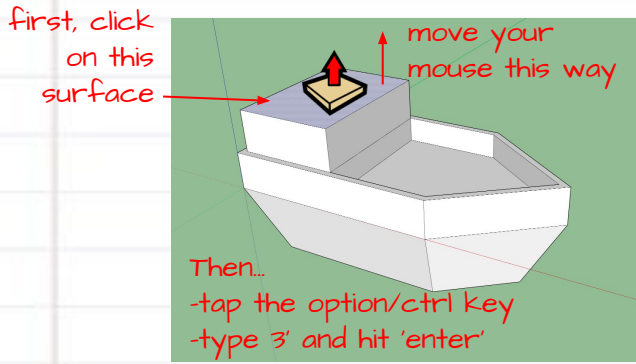
Draw from midpoint to midpoint of the rectangular part of the ship. Remember, the cyan dot indicates you are on the midpoint of a line.

first, click on this surface

move your mouse this way

then type 1' and hit 'enter'

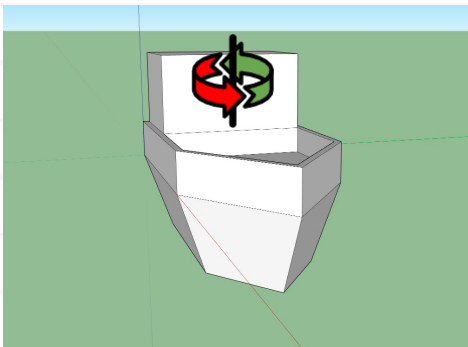**D** Select the push/pull tool from the menu on the left.

Click once in the middle of the pentagon shape, then move your mouse down on the screen. Type "1'", then hit enter to complete the push/pull.

4 The Cabin

first, click
on this
surface →

move your
mouse this way

Then...
-tap the option/ctrl key
-type 3' and hit 'enter'

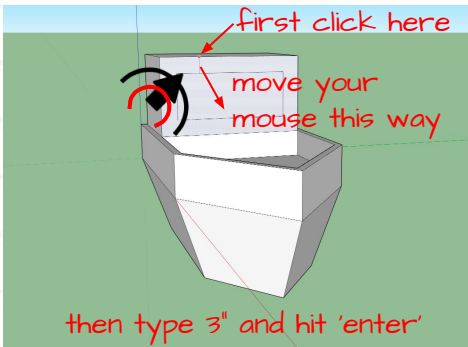**A** Select the push/pull tool from the menu on the left.

Click once on the top surface of the Ship's deck, then tap the option (Mac/Chromebook) or ctrl (PC) key to "create a new face." Move your mouse up on the screen, then type "3'" and hit enter to complete the extrusion.
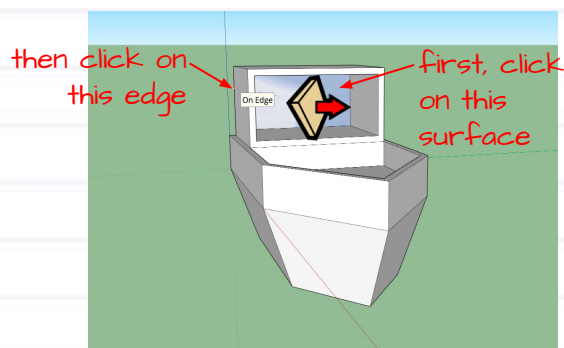
B Orbit to the front of your model.

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

first click here

move your
mouse this way

then type 3" and hit 'enter'

C Select the offset tool from the menu on the left.

Click on any edge of the front surface of the cabin, then move your mouse towards the center. Type "3"", then hit enter to complete the offset.

then click on
this edge →

On Edge

first, click
on this
surface

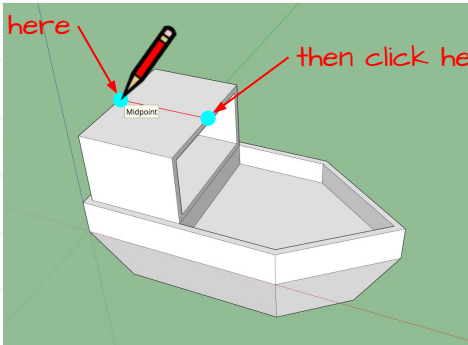**D** Select the push/pull tool from the menu on the left.

Click on the inset surface you just created and move your mouse onto an edge on the back of the cabin. When you see the words "On Edge" appear, click again to hollow out the cabin.
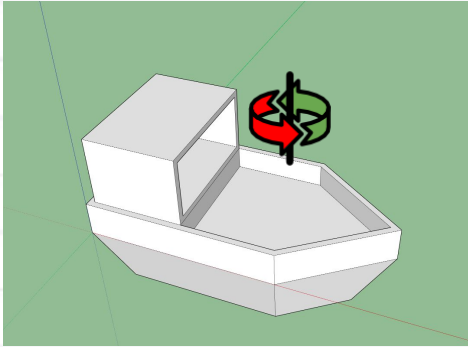
E Orbit to view where you can see the top and side of your model.

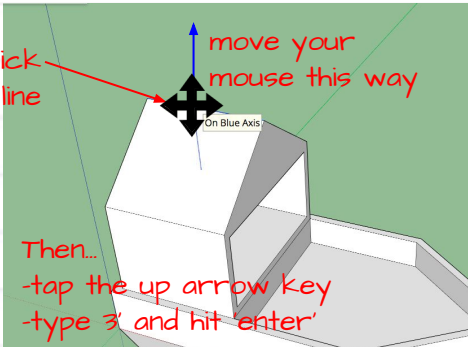Tip: check out this page for more info on orbiting.

first click here

then click here

Midpoint

F Select the line tool from the menu on the left.

Draw a line from midpoint to midpoint of the top of the cabin.

first, click on this line

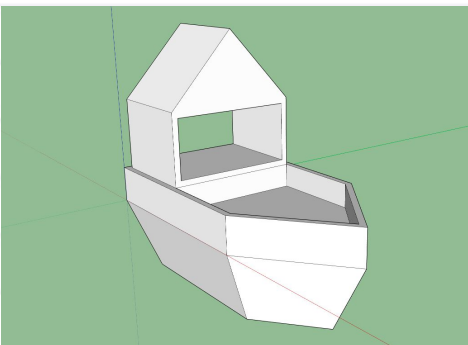move your mouse this way

On Blue Axis

Then...
-tap the up arrow key
-type 3' and hit 'enter'

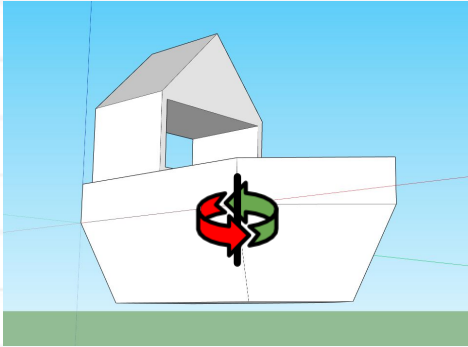**G** Select the move tool from the menu on the left.

Click once on the line you just drew. Move your mouse up on the screen, then tap the up (↑) arrow key to lock your line to the blue axis. Next, type "3", then hit enter to complete the shape.

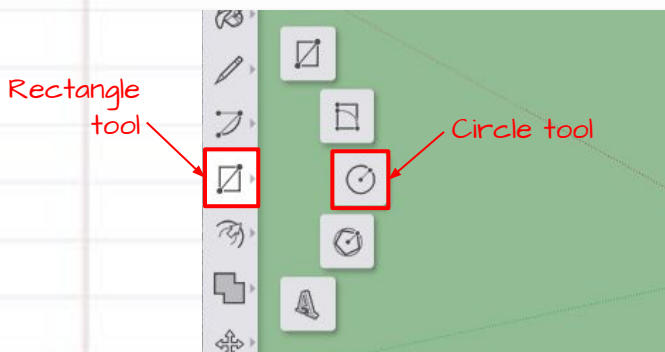Once you complete the ship's cabin, your model should look like this.

⭐ Keep going!
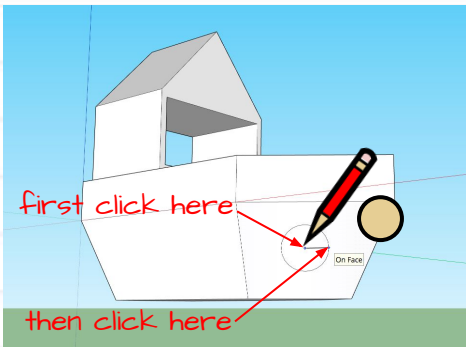This lesson continues

17

5 The Portholes

**A** Orbit to view where you can see the front and side of the ship's hull.

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

Rectangle tool

Circle tool

B Click the rectangle tool from the menu on the left to expand all the tools in the flyout. Then, select the circle tool.


first click here

then click here

On Face

C Hover your mouse on the hull's front surface until the words "On Face" appear. Click once near the middle of the surface to start your circle, then click again to set your circle.
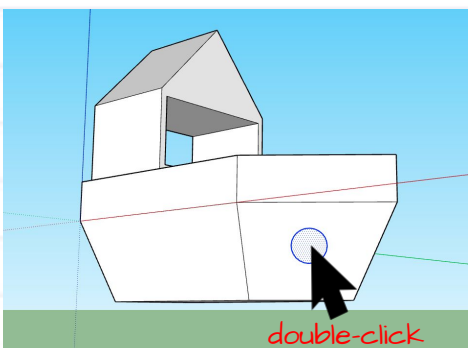
double-click

D Click the select tool from the menu on the left, then click once inside the circle to select just the surface. You'll know an object is selected when it is highlighted in blue.

Now, double click inside the circle to select both the surface as well as the circle's outline. Double-clicking will select a surface and all the edges that enclose it.
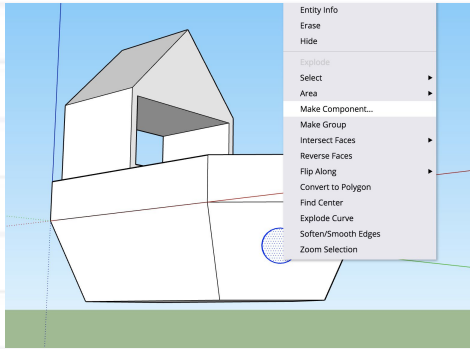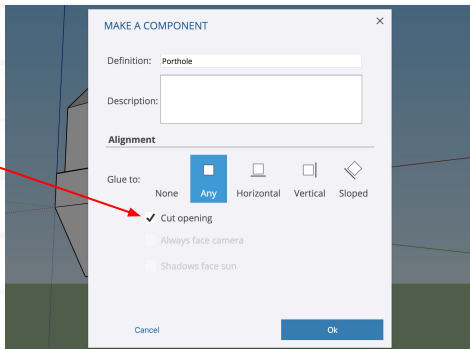
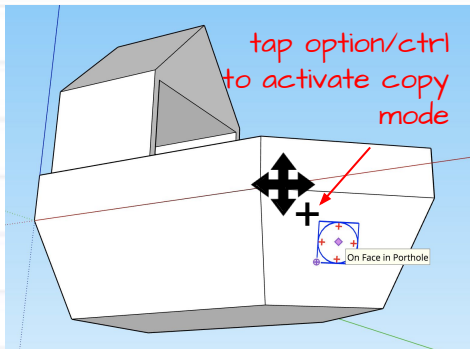**E** Right click on the selected circle, then click 'Make Component.'

You'll see how components work in the next few steps.

F In the 'Make a Component' dialog box, give your component a name and make sure to check 'Cut opening.' Leave the rest of the default settings as they are, then hit 'Ok.'
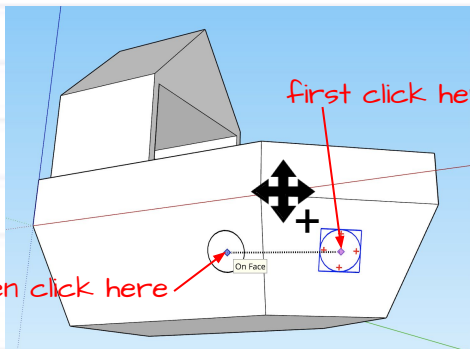
Cut opening

G With your porthole component still selected, click the move tool. Tap option (Mac/Chromebook) or ctrl (PC) to activate the copy tool (the + symbol indicates you are in copy mode).
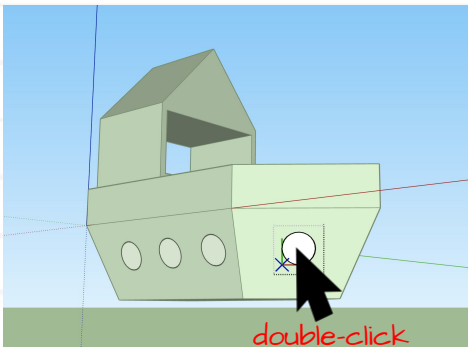
tap option/ctrl to activate copy mode

H Click once in the center of the porthole to make a copy, then click again on the adjacent hull face to place the copy. Make sure you see the words 'On Face' appear before you place the copy.
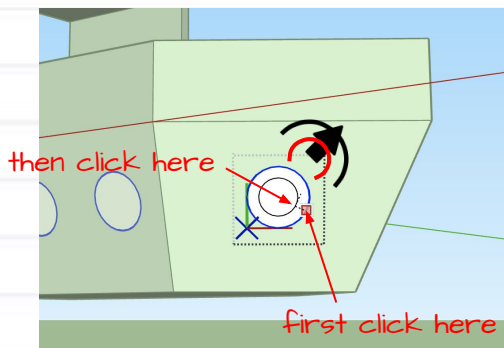
first click here

then click here
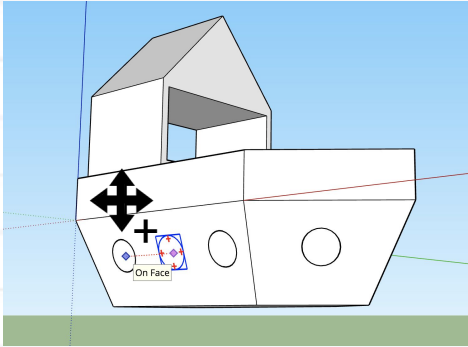
I Repeat steps G and H to place portholes all along the hull of your ship.


double-click

J Next, you'll experience the magic of components.

Click the select tool from the menu on the left, then double click into any of the portholes to edit the component.


then click here

first click here

K Select the offset tool from the menu on the left.

Click on the circle's edge to start your offset, then click again inside the circle to set your offset. This will be the rim of your porthole, so don't make your offset too thick!
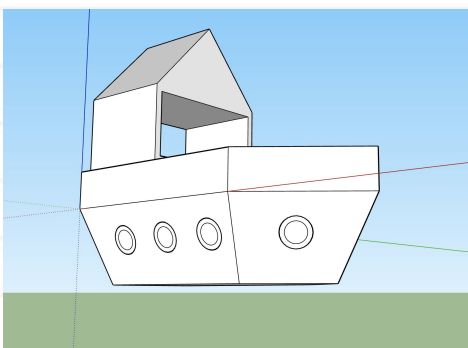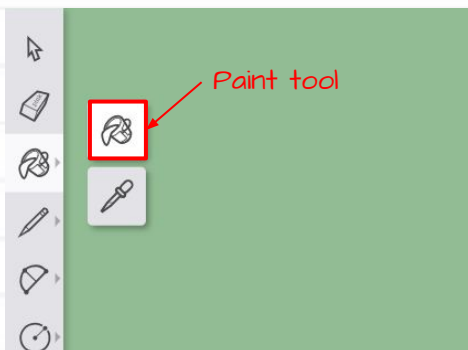

L Notice that all of your portholes now have a rim! And that's why components are such a lifesaver in models with repeating elements: you only have to edit one component to make a change in all your components.
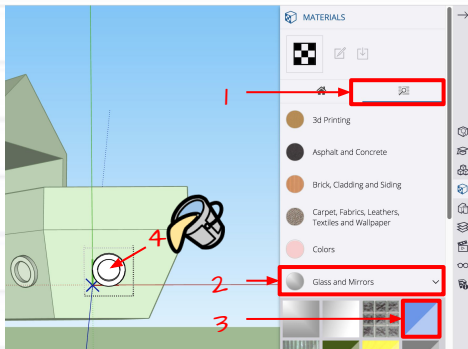
click here...
then type 2" and hit enter
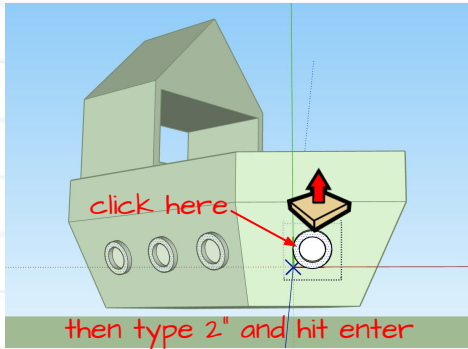
**M** Let's finish up the portholes. Select the push/pull tool from the menu on the left.

Click once on the rim surface, then type 2" and hit enter to complete the push/pull.

Paint tool

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

MATERIALS
1
3d Printing
Asphalt and Concrete
Brick, Cladding and Siding
Carpet, Fabrics, Leathers, Textiles and Wallpaper
Colors
4
2 → Glass and Mirrors
3

O 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 (1), and look for the category 'Glass and Mirrors' (2). Select a material for your windows (3) then click on the inner surface of the porthole (4).
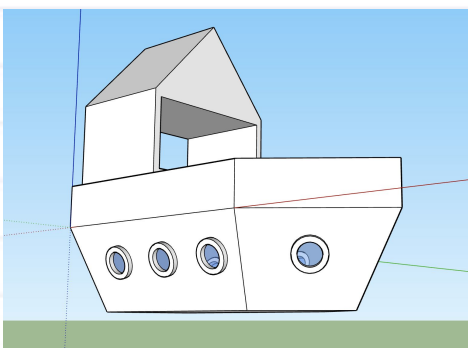

P To exit out of edit mode, click the select tool from the menu on the left, then double-click anywhere outside the component's bounding box.

Your portholes are done; let's move on to the next section of this tutorial.
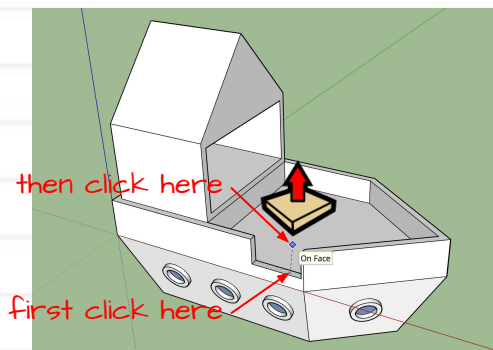
6 The Plank

click on the endpoint, then tap the left arrow key

then click here

On Edge
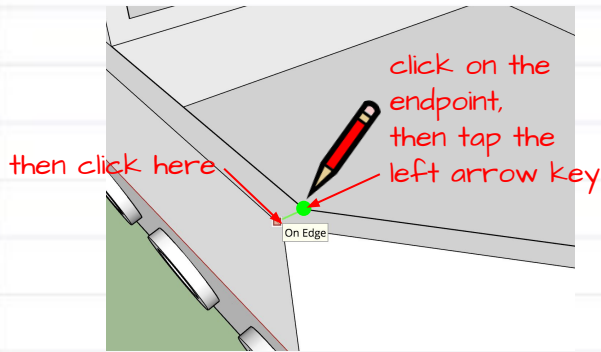
A Select the line tool from the menu on the left, then click the endpoint on the deck as shown in the image. Without clicking again, tap the left (←) arrow key to lock your line to the green axis. Click again on the opposite edge of the wall to set your line.


click on the midpoint, then tap the left arrow key

then click here

Constrained on Line Intersect Line
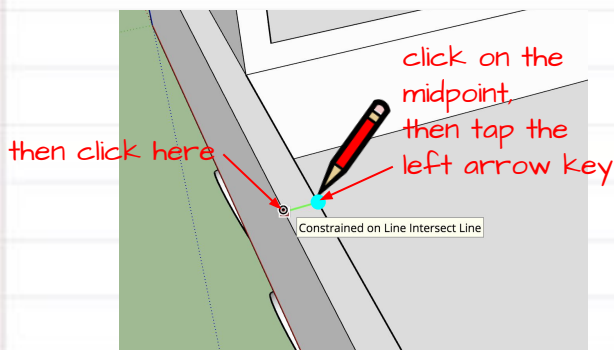
B Repeat step A, but this time start your line at the midpoint of the deck.


then click here

first click here

On Face

**C** Select the push/pull tool from the menu on the left.

Click on the surface between the two lines and move your mouse onto the floor of the deck. When you see the words "On Face" appear, click again to set the opening for your plank.

first click on this surface

move your mouse this way

then type 3" and hit 'enter'
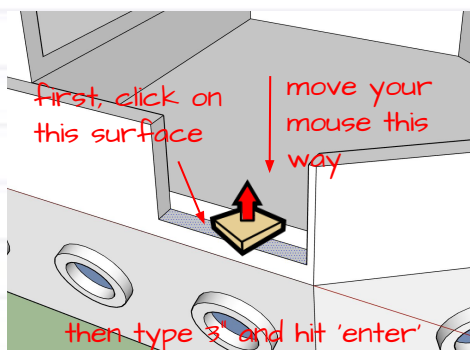
D With the push/pull tool still active, click once more on the same surface. Move your mouse down on the screen, then type "3"" and hit enter.

then click here

first click here
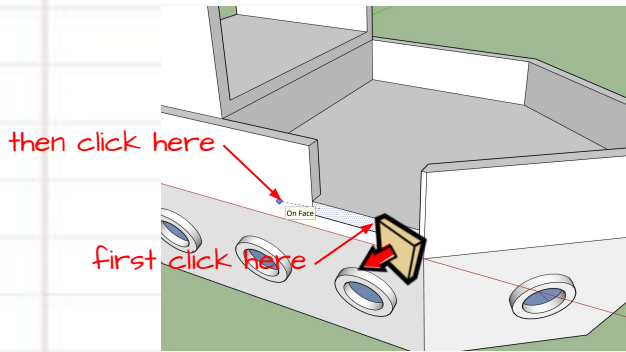
On Face

E Still using the push/pull tool, click on the surface shown in the image. Move your mouse onto the outside surface of the deck. When you see the words "On Face" appear, click again to set the push/pull.


first, click on this surface

move your mouse this way

then type 2' and hit 'enter'
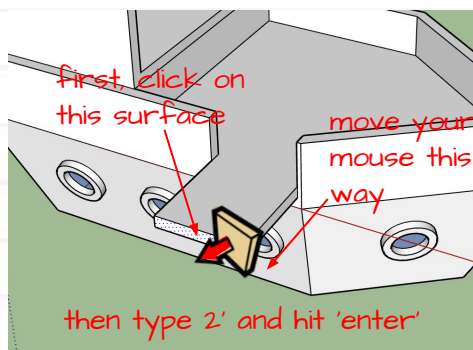
F Finally, click again on the same surface from the previous step. Move your mouse away from the ship, then type "2" and hit enter to complete the plank.

☆ Keep going! This lesson continues ⟶

# 7 Customize your ship: materials & the 3D Warehouse
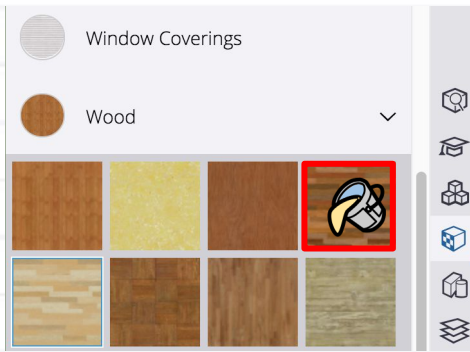
A Select the paint tool from the menu on the left, then select the category 'Wood' from the materials library on the right. Choose a wood material for your ship.
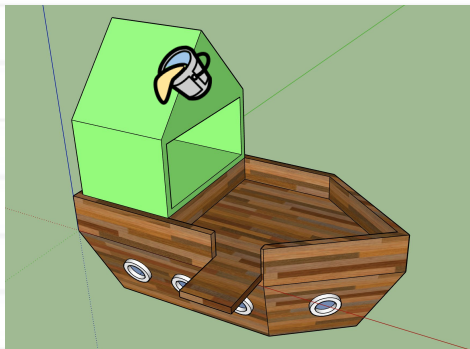

B Click on all the faces that you want colored with wood paneling. Select other colors from the materials library and continue to "paint" your model.

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.
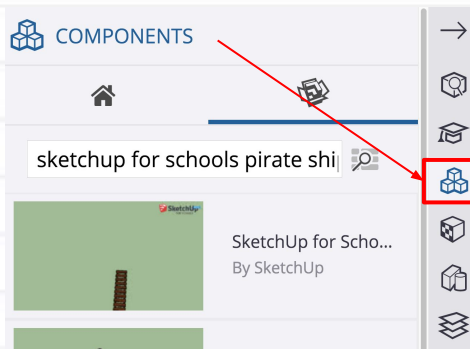

C Your pirate ship is almost complete! Let's jazz it up with some fun models from SketchUp's 3D Warehouse.

First, click the 'Components' panel on the right. Then, type "SketchUp for Schools Pirate Ship Playhouse" in the search window.

then click here

first click here
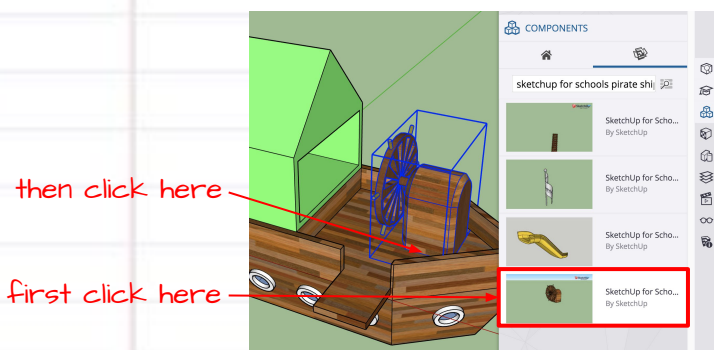
D Click on any of the models that appear in the components panel, then click inside your ship to place them.

⭐ That's it, you're done! Have fun with your new SketchUp skills and look out for more tutorials from SketchUp.
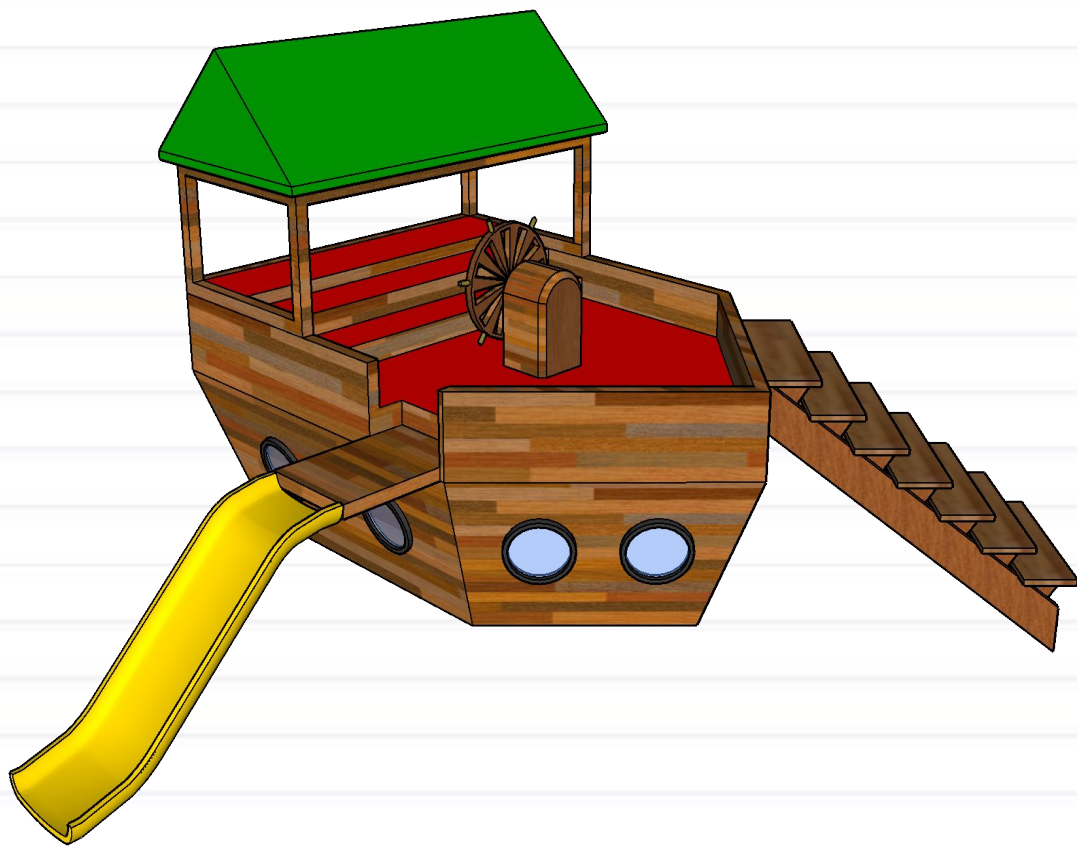
Make your pirate ship playhouse your own by adding colors and more models from SketchUp's 3D Warehouse!