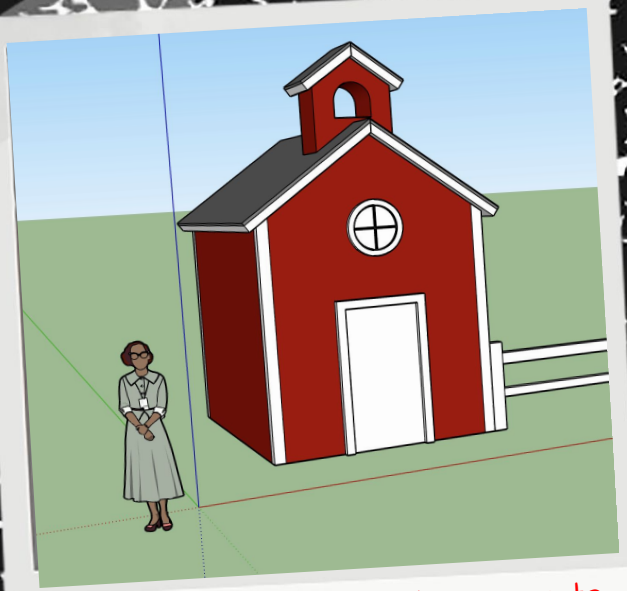
SketchUp

FOR SCHOOLS

Lesson Plan:

SketchUp Obstacle Course

Beginner Lesson · Time to complete: 60 mins



Move through an obstacle course to grow your SketchUp skills!

outline

page

Hi, I'm Katherine

Thanks for checking out another SketchUp for Schools lesson plan! I'll be with you the whole way, giving you tips and tricks for how to model like a pro in SketchUp for Schools.

Don't forget, there's also a video for this lesson plan!

Happy Sketching,
Katherine

Learning Objectives

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

 Pan

 Orbit

 Zoom

 Select

 Move

 Line

 Rectangle

 Paint Bucket

 Eraser

 Tape Measure

 Push/Pull

 3D Warehouse

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

- [x] Moving through Scenes in SketchUp
- [x] Selecting, deleting, and drawing edges
- [x] Adding material to a face
- [x] Push/Pulling a face to a specific height
- [x] Moving an object

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

2 Leader

Educators seek out opportunities for leadership to support student empowerment and success and to improve teaching and learning.

This lesson fulfills 2b, 2c

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

5 Designer

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

This lesson fulfills 5a, 5b

6 Facilitator

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

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

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

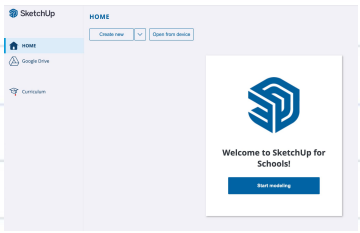
   (Instructions for Google & Microsoft Admins)

PRO TIP #1

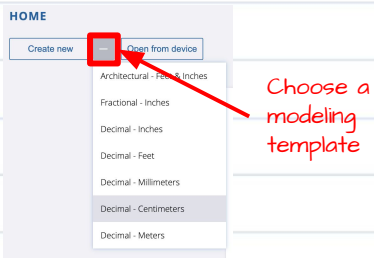
Save often!

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.

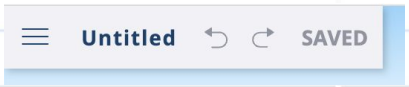
Saving Files



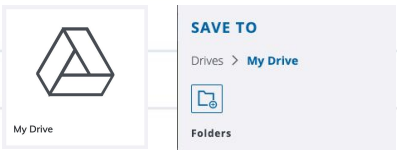
A This is the SketchUp for Schools home screen. Here you can start a new project by clicking "Start Modeling" or "Create New". Both will open SketchUp's default template.



B Or you can choose a template in your preferred unit of measurement. For this lesson, we'll be using Decimal - Centimeters. Choosing a template will start a new project as well.

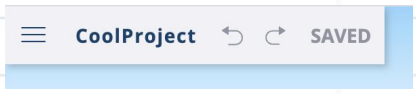


C Once you start a new project, it's a good idea to name & save your file first. Click on "Untitled" in the top left.



D SketchUp will open your Google Drive or Microsoft OneDrive. Now you can create a new folder entitled "SketchUp Projects".

E Name your project, then click "Save Here".

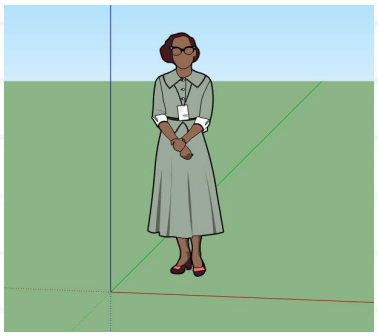


F If you've done everything correctly, you'll see your file name in the top left corner along with a 'Saved' message.

The Scale Figure

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

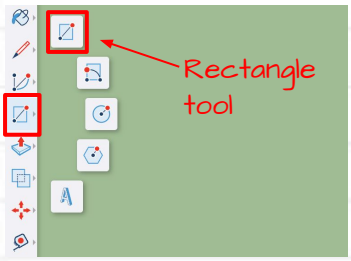
For example, Katherine is 5'5". If we draw a 3 foot cube next to her, the cube will be about half her height.



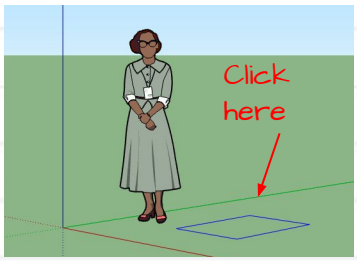
PRO TIP # 2
Unless otherwise specified, a click in SketchUp is executed as "click and release."

Drawing a Cube

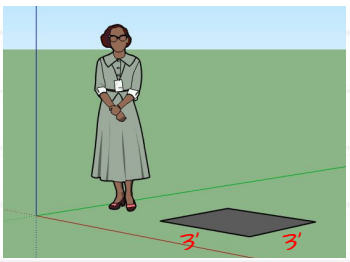
Let's test it: let's draw a 3 foot cube next to Katherine.



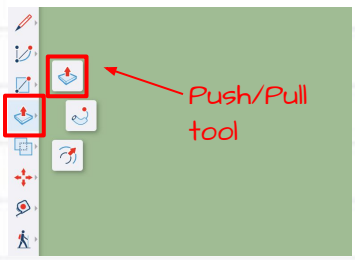
A Select the rectangle tool from the menu on the left.



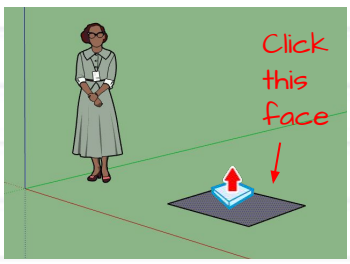
B Click once on the ground near Katherine's feet to set one corner of your cube.



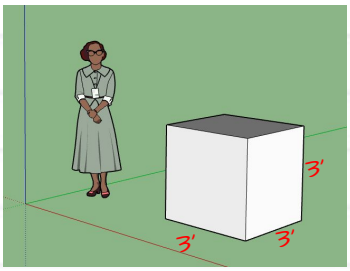
C Without clicking again, move your mouse anywhere on the screen, then type " 3', 3' ", then hit 'enter'.



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

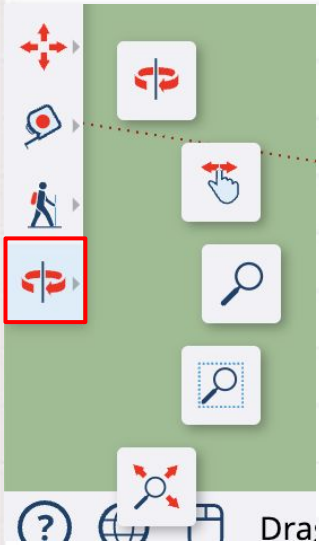


E Click once on the face you just drew. Without clicking again, move your mouse to make your cube 3D.



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

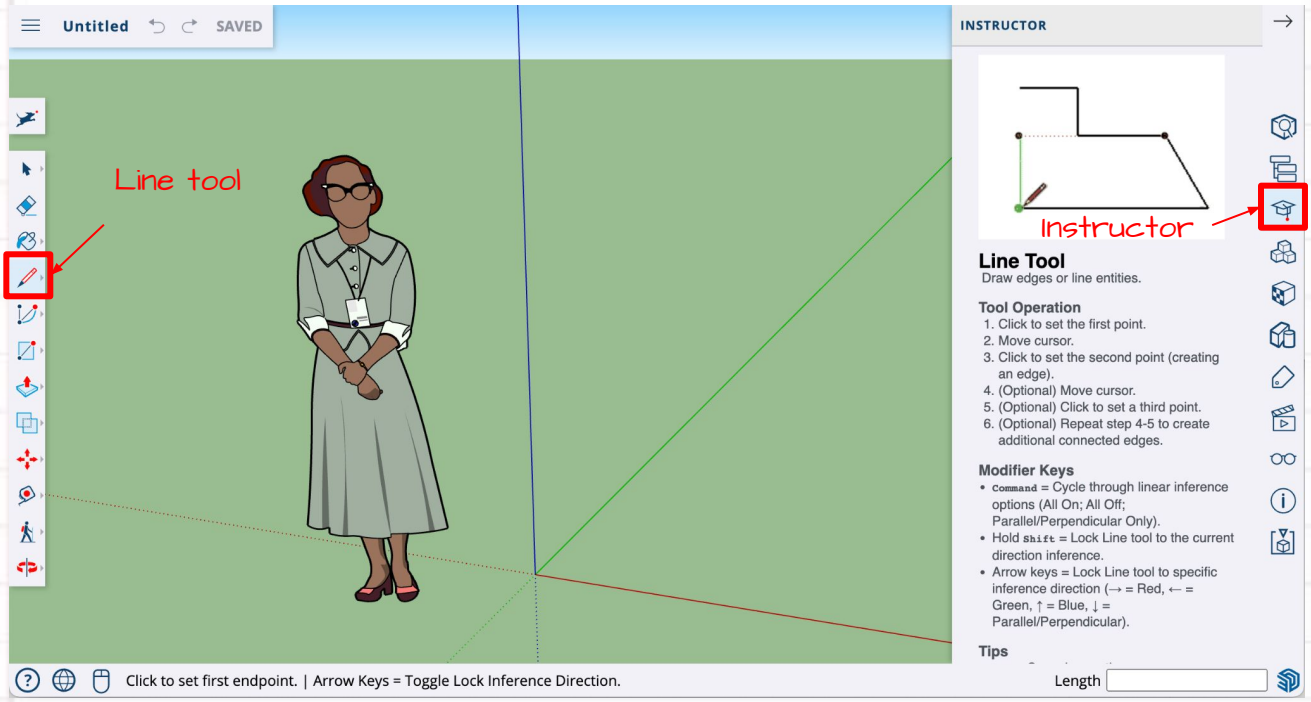
The Zoom Window tool allows you to select an area of your model to view closer. Click on the Zoom Window tool, then left click-hold-drag your mouse to highlight an area of your model.

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.

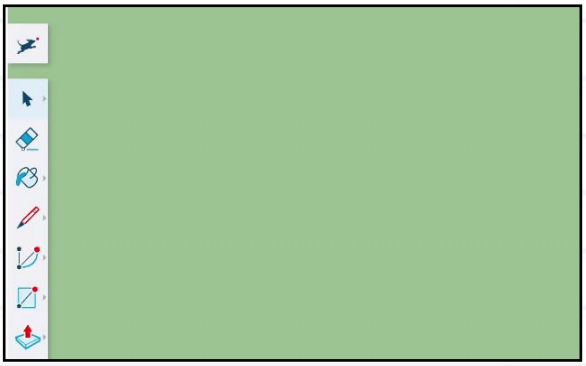
The Instructor Panel

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.



Searching in SketchUp

All of SketchUp's drawing tools can be found in the left hand menu, however, you can always use the search function to find a tool more quickly. This is also where you will find keyboard shortcuts for tools, and where you can edit and assign your own shortcuts.



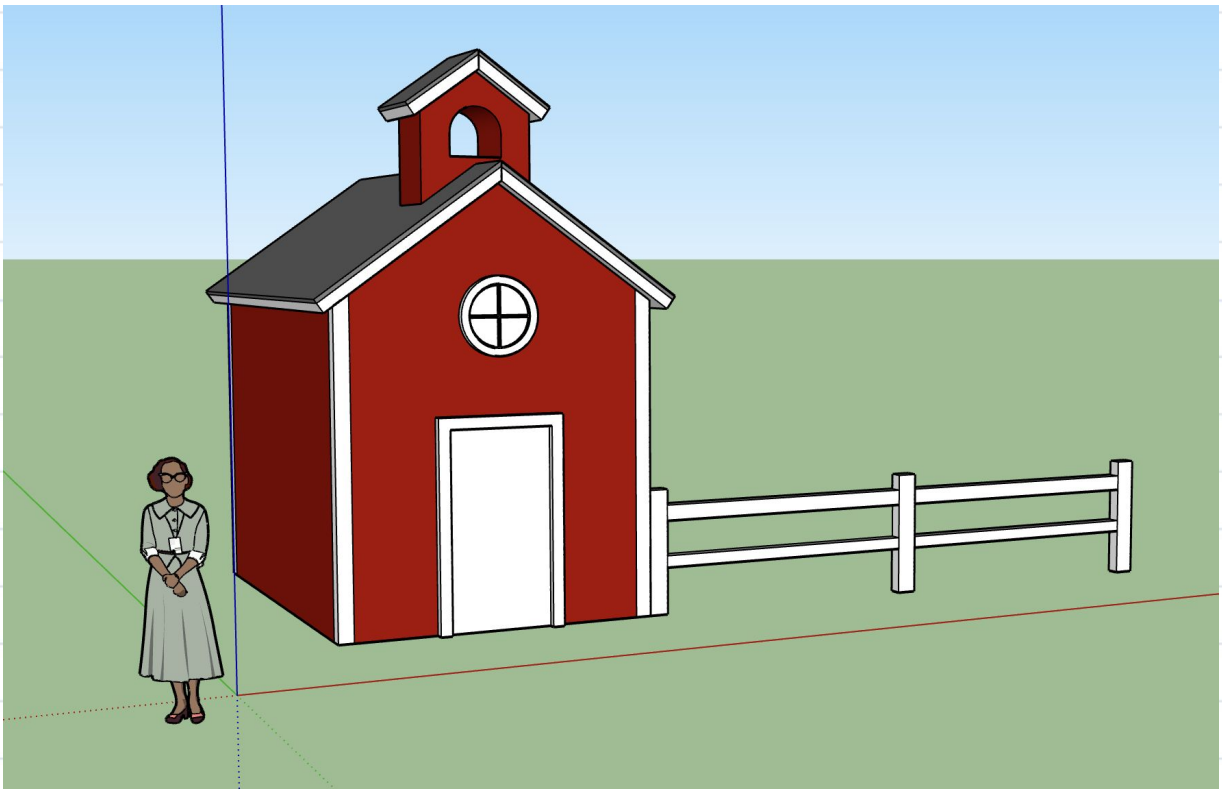
That's it for the intro.
You're ready to get started on modeling!

step-by-step tutorial:

SketchUp Obstacle Course

pre-flight checklist

- [x] You're logged in at edu.sketchup.com/app
- [x] You've gone through the SketchUp for Schools intro and feel comfortable navigating around in the model window.
- [x] You've setup at least one folder in Google Drive or Microsoft OneDrive for your SketchUp models



Check out the companion video for this lesson plan here!

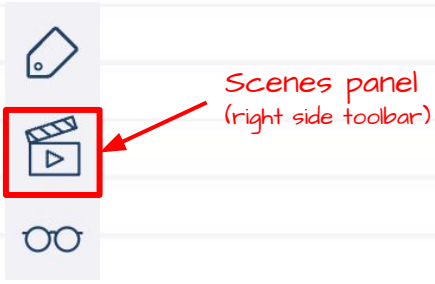
Let's Go!

SketchUp Obstacle Course

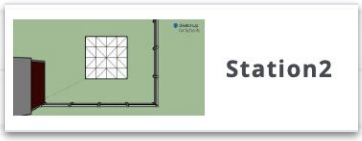
Ready to flex your SketchUp muscles? Move through this fun obstacle course to grow your skills at each station.

A First: if you haven't already, open the obstacle course file.

You'll automatically start at Station 1. Practice using the Orbit, Pan, and Zoom tools you learned about in the intro slides to navigate around the red school building.

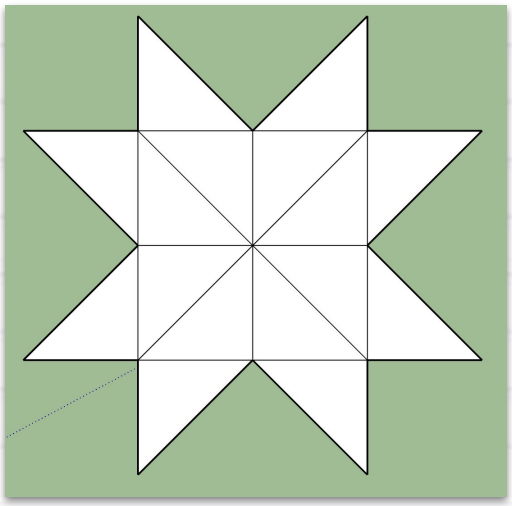


B Click on the Scenes panel, and choose the thumbnail for "Station 2". Close your Scenes panel.



C Erase edges to carve out a star using two methods:

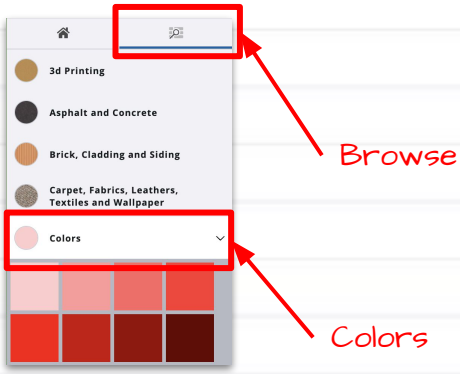
1. Use your Eraser (E) tool to erase edges. This will subsequently erase faces as well.
2. Select (Spacebar) an edge and tap "delete" on your keyboard.



If you accidentally erase an edge that you didn't intend to, tap the "undo" icon at the top left of you screen, or Control + Z.

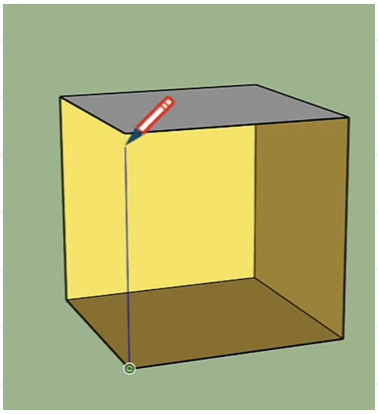
D

Now you can add some of your favorite colors to the star. Open your Materials panel. Click on the magnifying glass icon to browse and scroll down to "Colors". Click on a thumbnail, then click on the face you'd like to apply it to.



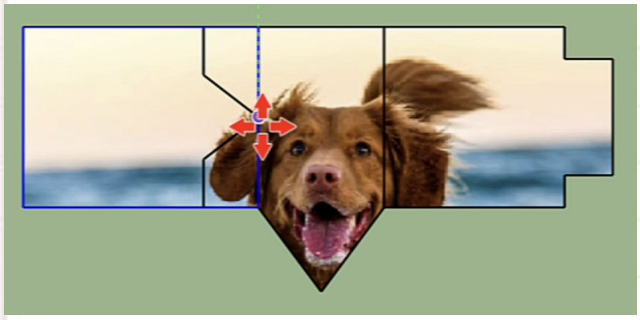
E

Return to the Scenes panel and click on "Station 2". In the previous station we deleted edges... in this one we will add edges! Using the Line (L) tool, heal the missing edges from each cube to form a face. Click-release on one endpoint (green dot) and then the opposite endpoint.



Practice drawing lines until you find the one needed to complete each cube.

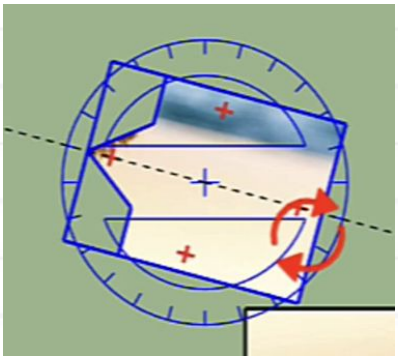
F Reopen the Scenes panel and click on "Station 3". Here you will use the Select (Spacebar) and Move (M) tools to put together a puzzle of a dog. Choose a starting piece by preselecting it (Spacebar + click-release).



G With the puzzle piece preselected, activate your Move (M) tool. Click-release on an endpoint to begin moving, then snap it to the endpoint of another piece. Click-release to set the piece down.

If you accidentally do something in SketchUp you didn't intend to... just press undo in the top bar next to your file name. Control + Z also works!

Tip! When using the Move tool, be strategic about your "click-point" so that you can line up the puzzle pieces with more precision. (Choose the endpoints and corners.)

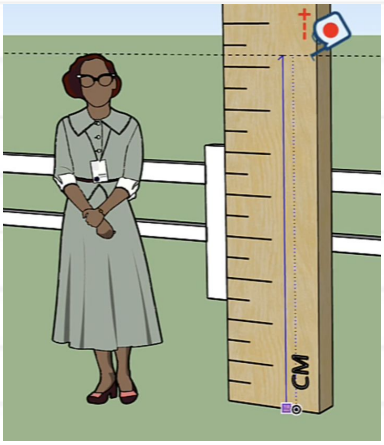


H Some of these puzzle pisces need to be rotated. You can use the Move (M) tool to do this. Hover over the piece you'd like to rotate, red plus signs will appear. Click-release on a plus sign and move your cursor along the tick marks of the rotation wheel. Click-release to set the angle.

I Do you want to move more than one puzzle piece at a time? Start by activating your Select (spacebar) tool, then hold down the Shift key. Click-release on more pieces to add or subtract from the selection.

Tape Measure Tool

J Once you complete the puzzle, open the Scenes panel and click on "Station 5". Let's measure! Activate the Tape Measure (T) tool.

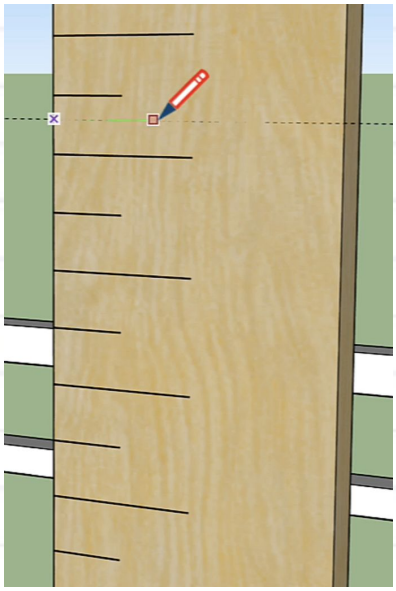


K Hover over the bottom of the ruler to find the edge (not the endpoint). Click-release and move your cursor upwards. See the dashed line that moves with your cursor? That's your guideline. As you move your cursor up and down, notice the measurements box in the lower right corner. It is showing you the height of the guideline.

As you measure (and draw geometry) watch the measurements box.

L If you want to measure the height of something, you'll need to lock the inference to the blue axis. Tap the up arrow to lock and unlock the blue axis inference. Now hover over Katherine's head to see her height. Click-release to set the guideline.

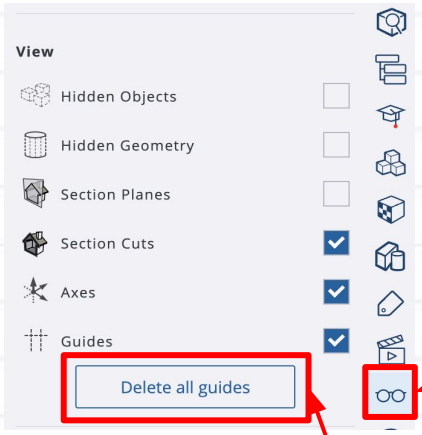
Tip! There is never a need to click on the measurements box. It is always waiting for your input.



M

Activate the Line (L) tool. Draw a mark on the ruler at the same height as the guideline (Katherine's height).

Now mark your own height. Start a new Tape Measure (T) action, click-release on the base of the ruler, then move your cursor upwards. Type in your height. Then draw a Line (L) to mark your height as well.



N

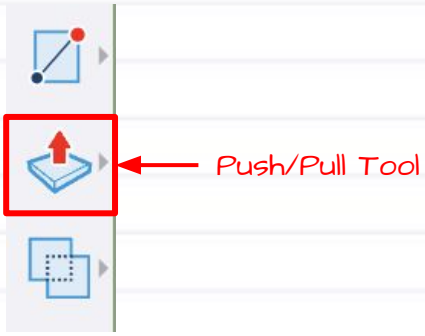
Once you are done using the guidelines, open the display panel (eyeglasses symbol). Then click "Delete all guides".

Close the display panel.

O

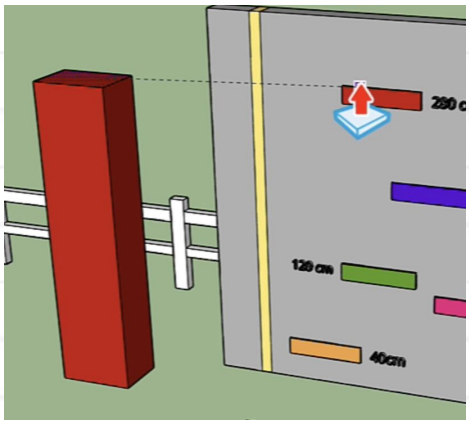
Onto the next station! Open the Scenes panel and click on "Station 6". Here you will use the Push/Pull (P) tool.

The rectangles on the wall are going to be the height of each color coordinated block on the ground.

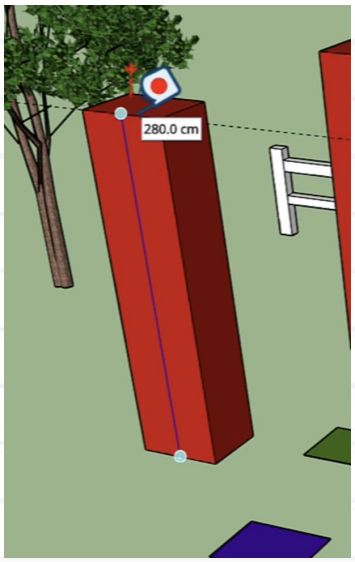


P

Activate the Push/Pull (P) tool. Click-release on a rectangle on the ground and move your cursor upwards. Hover your cursor over the top of the corresponding wall rectangle. Click-release to set the height.



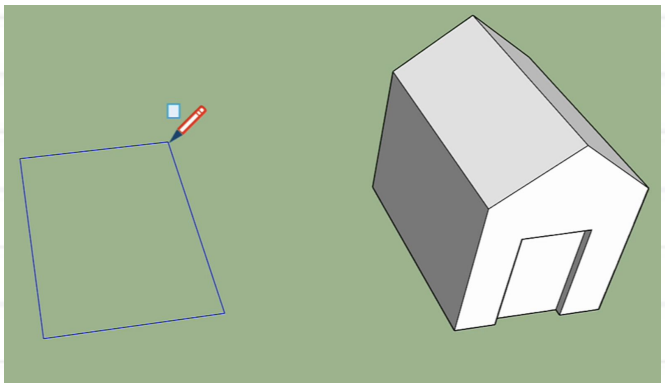
*Using the height of the existing block for reference is called "**inferencing**".*



Q

With the Push/Pull (P) tool still active, you can double-click on any face to repeat the previous height. To check the height of each cube, use your Tape Measure (T) tool.

Continue to Push/Pull each cube to the corresponding shape on the wall. Orbit (O) as needed to see all of the shapes.



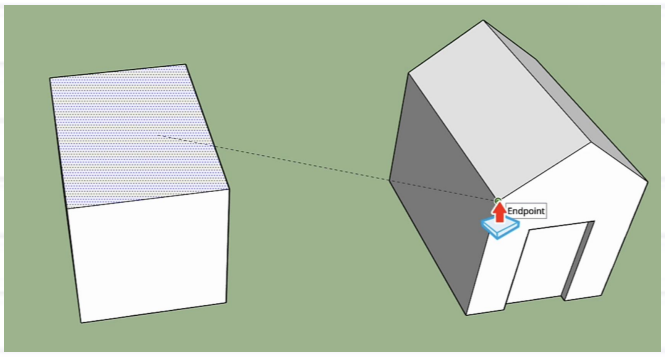
In SketchUp we use a comma instead of "x" when entering dimensions for a rectangle. So....

200 x 300
becomes
200, 300

R Open your Scenes panel and move to "Station 7" where we will draw a small house. Orbit (O) and Pan (H) until you have space to draw next the existing house.

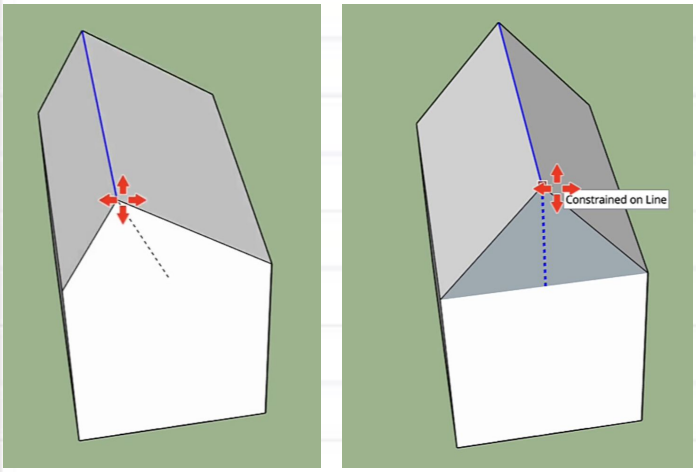
S Activate your Rectangle (R) tool. Click-release on the ground and move your cursor upwards and over.

Type the size of the rectangle with a comma in the middle. "200, 300" + enter.



T This rectangle will become our walls. Using the Push/Pull (P) tool, click-release on the shape and move your cursor upwards. You can either:

1. Hover over the top of the wall on the house next to this and click-release to set it.
2. Or you can type "200" + enter to set the walls at 200 centimeters high.

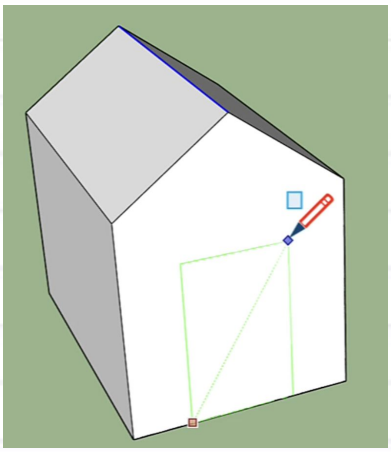


*Tap the **up arrow** on your keyboard to lock your inference to the blue axis.*

u

To create the peak in the house, draw a Line (L) up the middle (blue dot to blue dot). Then preselect the line with your Select (Spacebar) tool. Once it's blue, use your Move (M) tool to pull it straight upwards. If you need to lock it to the blue axis, tap the up arrow on your keyboard.

Type **35** + **Enter** or infer/ hover over the peak in the house next to this one and click-release to set it. .



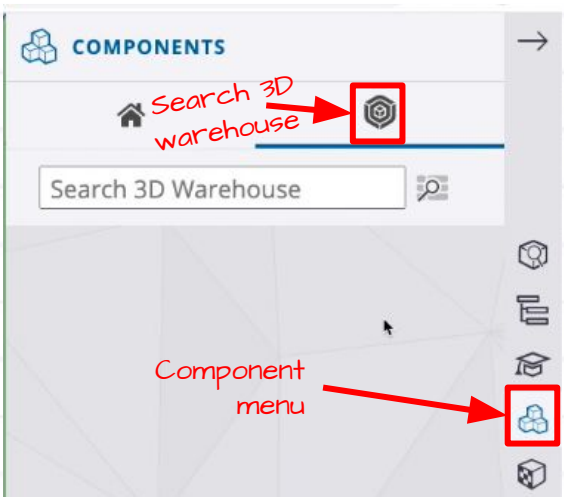
v

Lastly, add a door to your house with the Rectangle (R) tool. Click-release along the base of the home, then move your cursor upwards and over. Click-release to create the rectangle. Use your Push/Pull (P) to push the shape backward slightly.

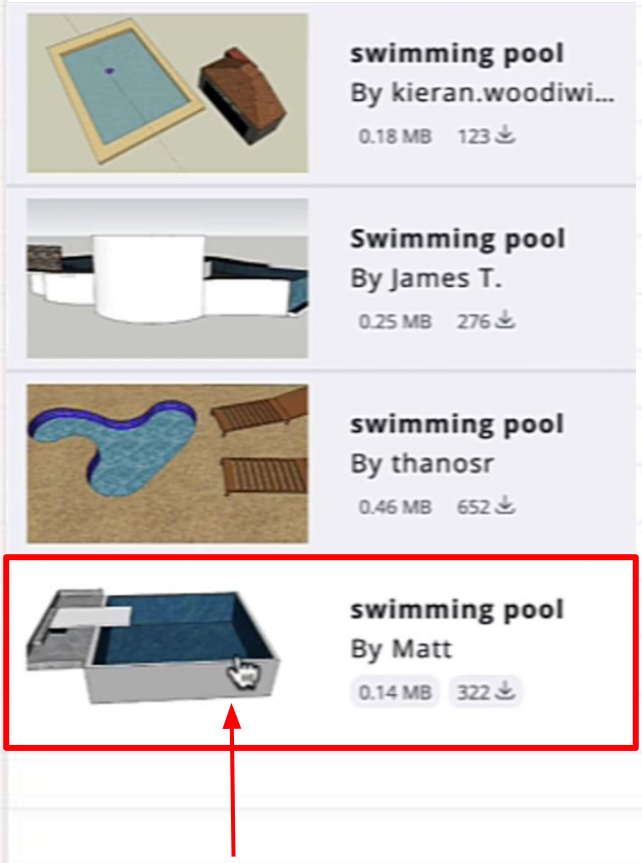
w

Open your Scenes panel and head to our last station... Station 8!

Here you can decide what you'd like to add to this schoolhouse using the 3D Warehouse

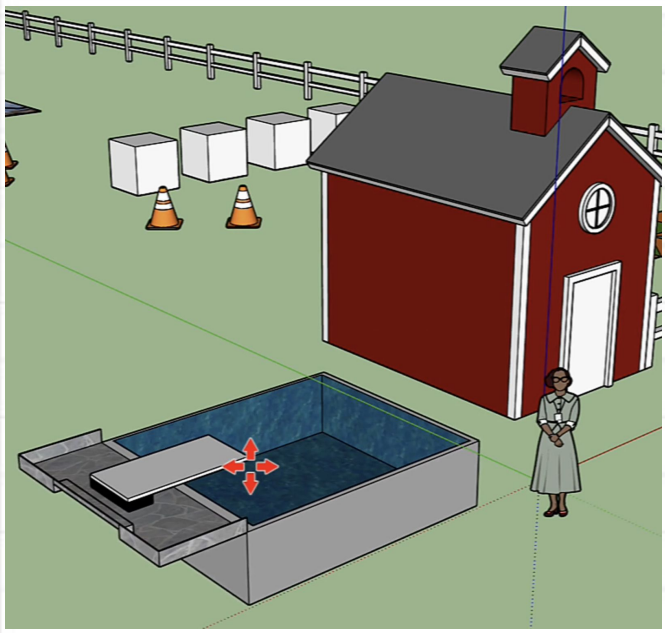


X Navigate to the 3D Warehouse by opening up the Component panel on the right hand toolbar and then clicking the 3D Warehouse icon. You'll see a search bar that will let search for objects in the warehouse.



Y Search for an object that you would like to add to the playard of the schoolhouse. If you aren't finding what you are looking for, think of another word to describe it and try that.

I'm choosing to add a pool, but had to change my search to "swimming pool" instead of "pool" to find what I needed. Once you've found something you like, click on it and it will be downloaded and brought into your model.



When you download an object from the 3D Warehouse, it is automatically attached to the Move tool. Click-release to set it down.

2 Objects from 3D Warehouse come into the model attached to your cursor and they will follow it until you click to set them down. Click near the ground next to the schoolhouse to set it down.

Once you are happy with the placement of your object, hit Spacebar (to activate your Select tool) and click into some blank space to deselect your object.

You did it! Open your Scenes panel and go to "Well Done!"

That trophy is for you! Great job making it through all of the stations.

Now you are ready to move on to more lessons with SketchUp for Schools. Head back to the video library to check out all of the projects that you can draw with us!