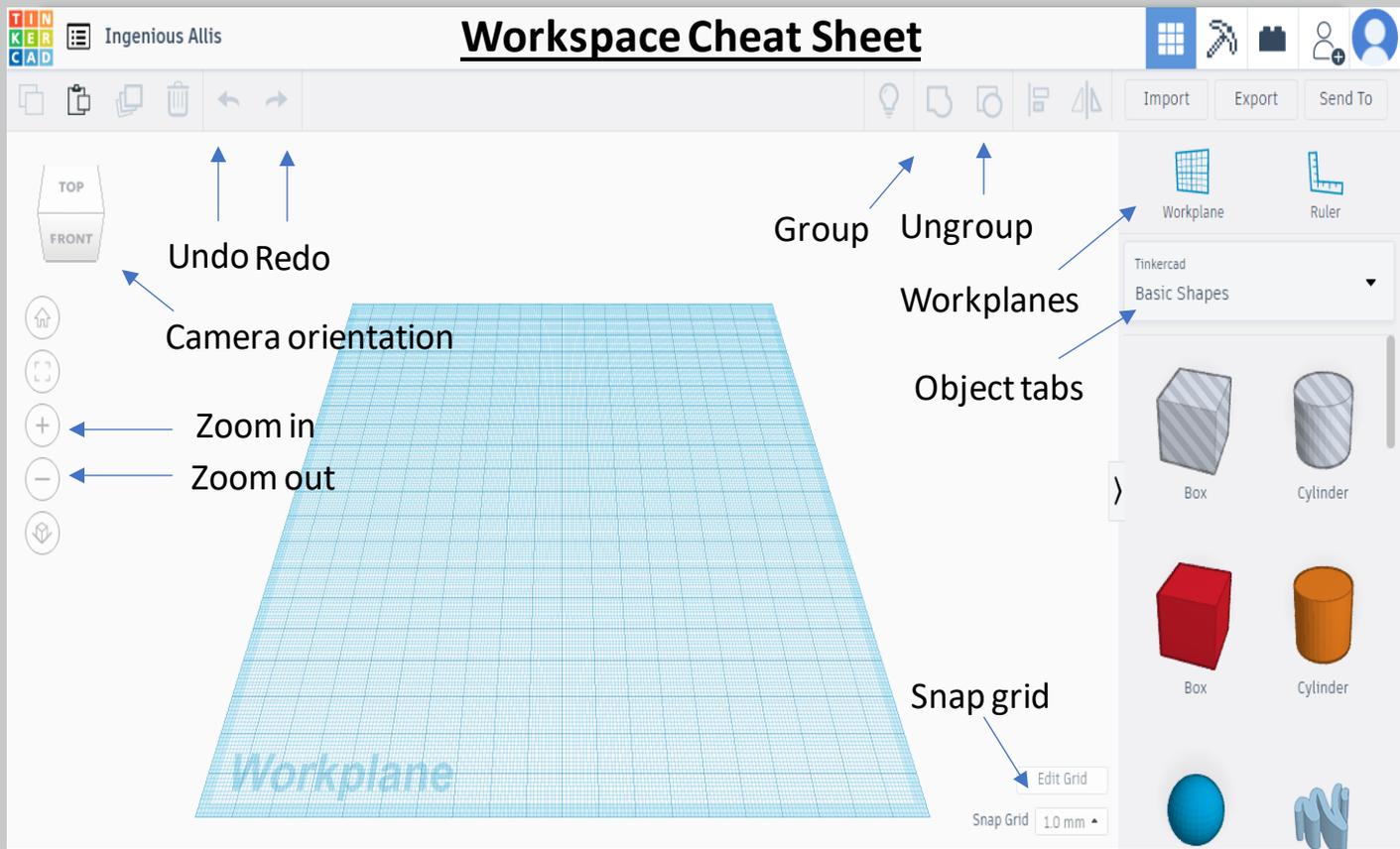


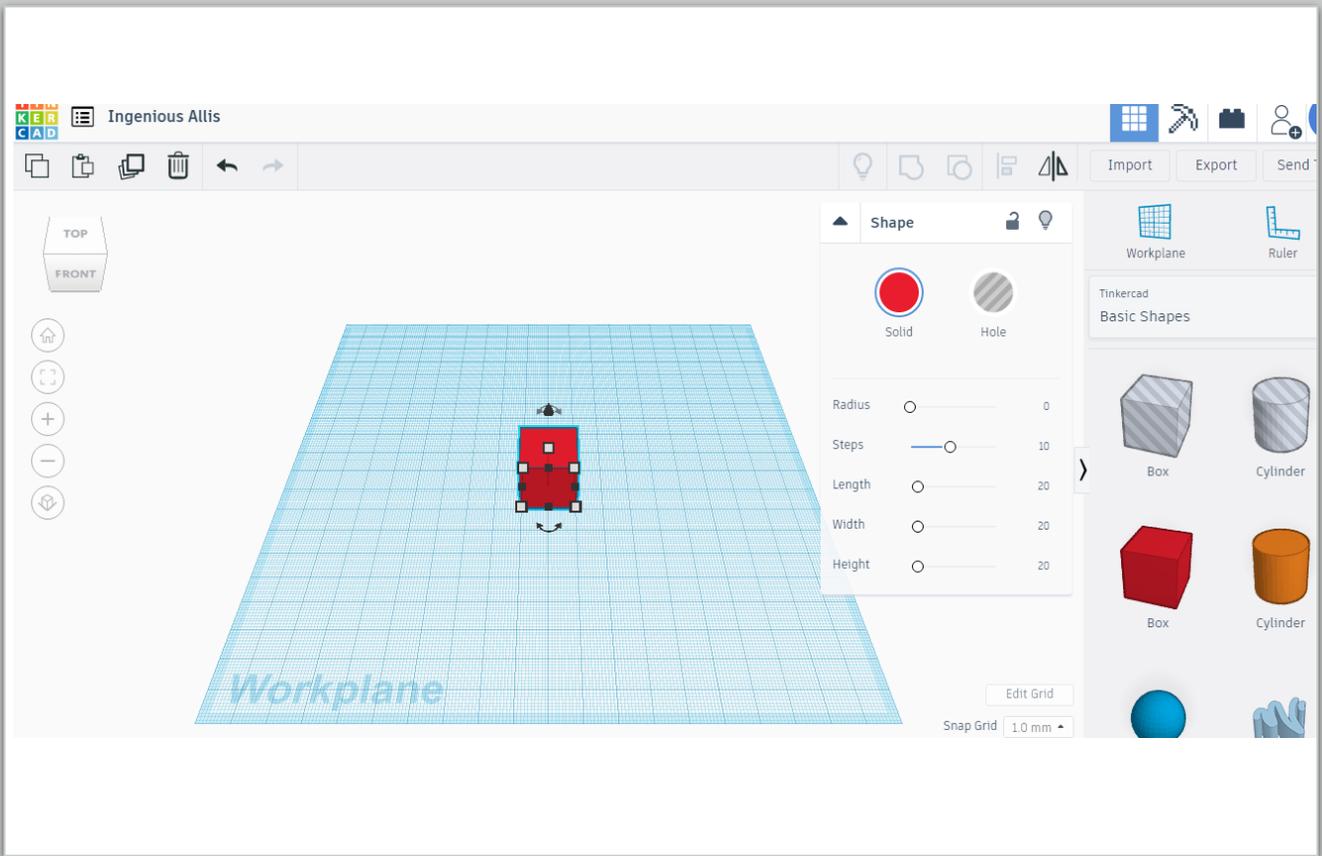
TinkerCad Basics

Learning TinkerCad by building a (miniature) house



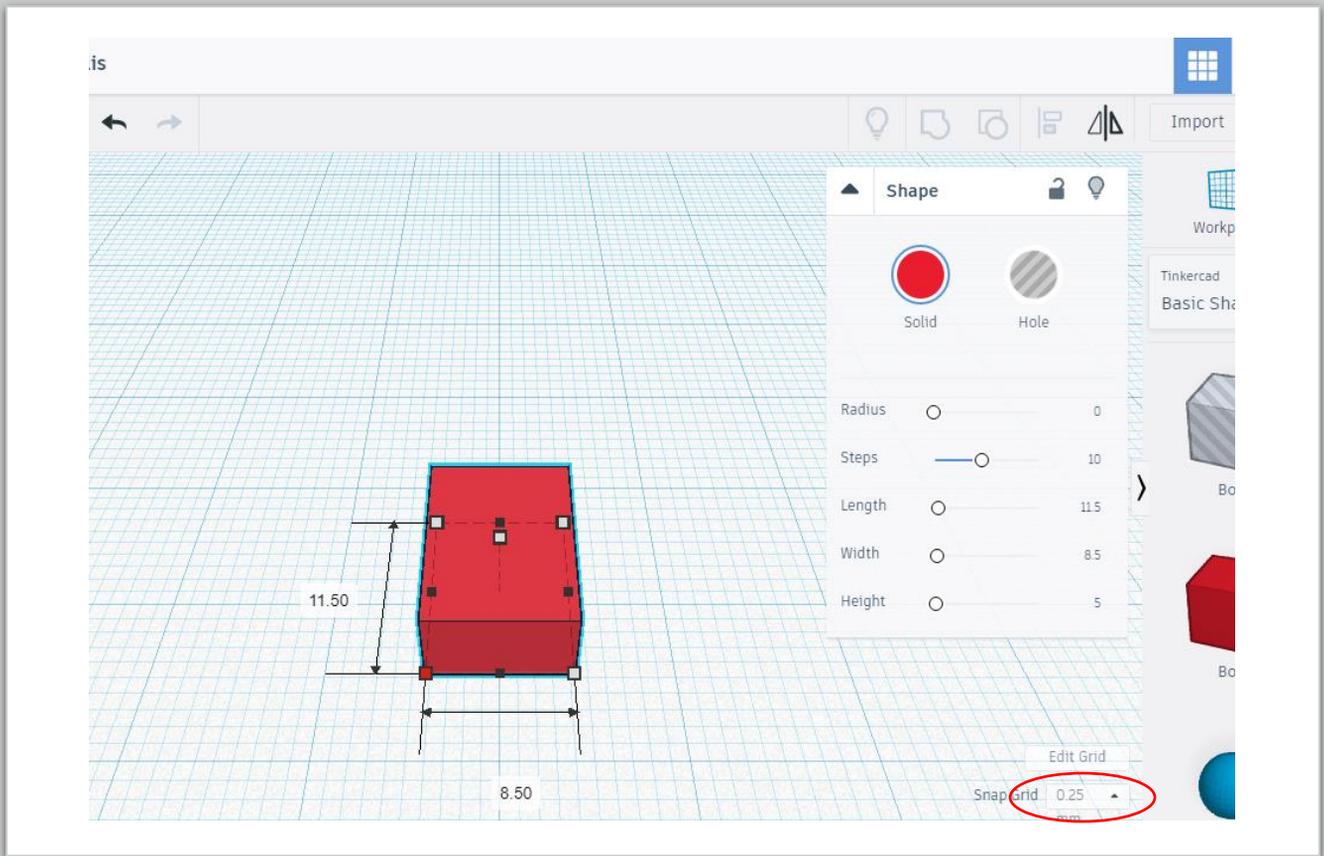
Building The Groundwork

- This guide will go over the basics of TinkerCad, through making a small house
- These are the things you will learn:
 - How to create and manipulate objects
 - How to move the camera
 - How to use workplanes
 - How to create and manipulate holes
 - How to group objects
 - (Optional) How to change object color



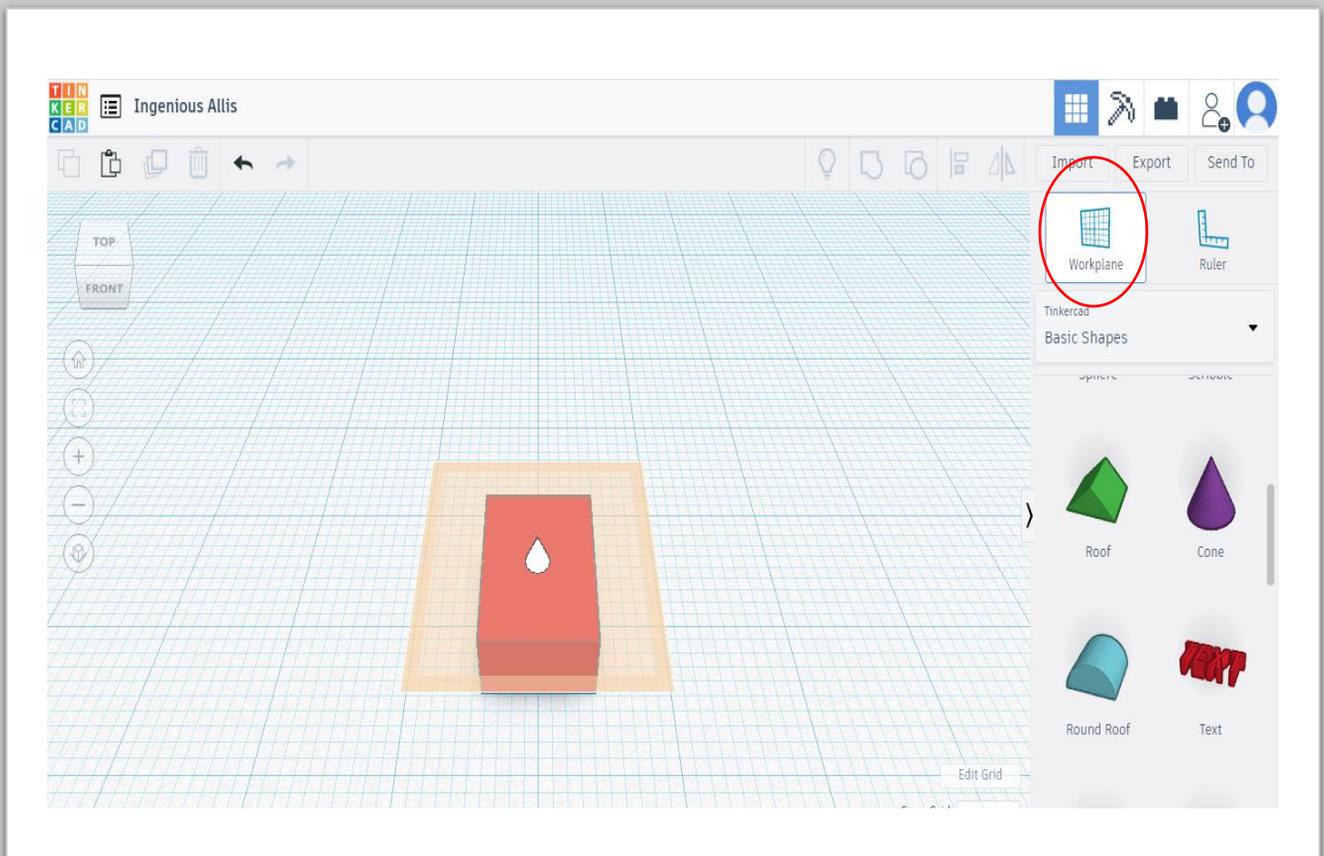
Step One: Creating An Object

- Under “Basic Shapes” in the righthand column, click on “Box.” Then, move your cursor over the workplace and click. A box should appear where you clicked.
- When you click on the box, little white squares will appear around the object. These white squares allow you to change the height, length, and width.
- To control the camera, you can (i) use the small white box in the upper left corner, (ii) click the small “+” and “-” circles on the left, or (iii) simply click and hold the right mouse button while moving the mouse



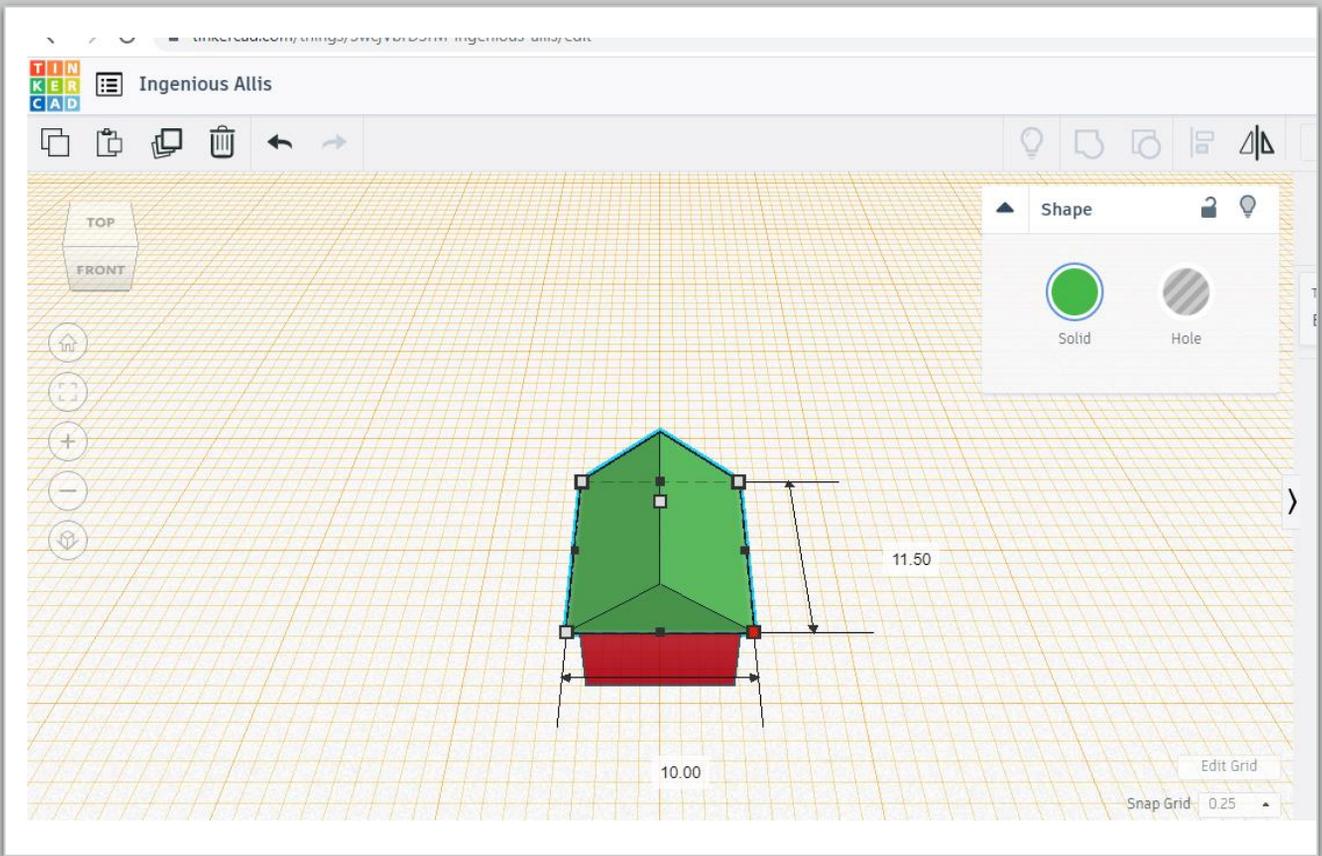
Step Two: Changing Size

- You can do this either by (i) clicking and holding a white square and dragging, or (ii) clicking a white square, clicking the number which appears, and typing in the desired quantity.
- Length: 11.5mm
- Width: 8.5mm
- Height: 5mm
- NOTE: Changing snap grid (in red circle) to 0.25 or 0.5 will make adjustments more precise.



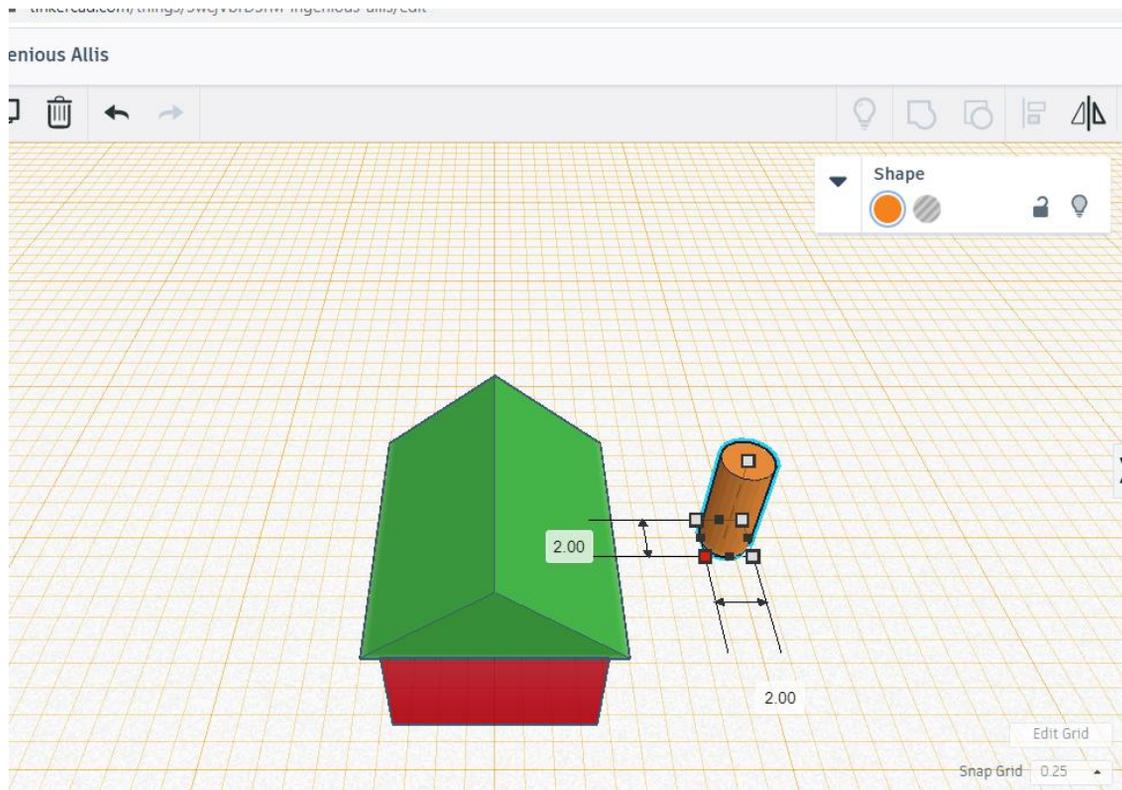
Step Three: Creating New Workplanes

- Next, we are going to want to add a roof on top of our box. But first, in order to do that, we have to create a new workplane. Creating a workplane on an object allows us to stack objects together.
- Click the “workplane” option (see red circle) and hover your mouse over the top of the box. The white cone should be flat with the box. Click to create the new workplane. The new workplane should look orange.



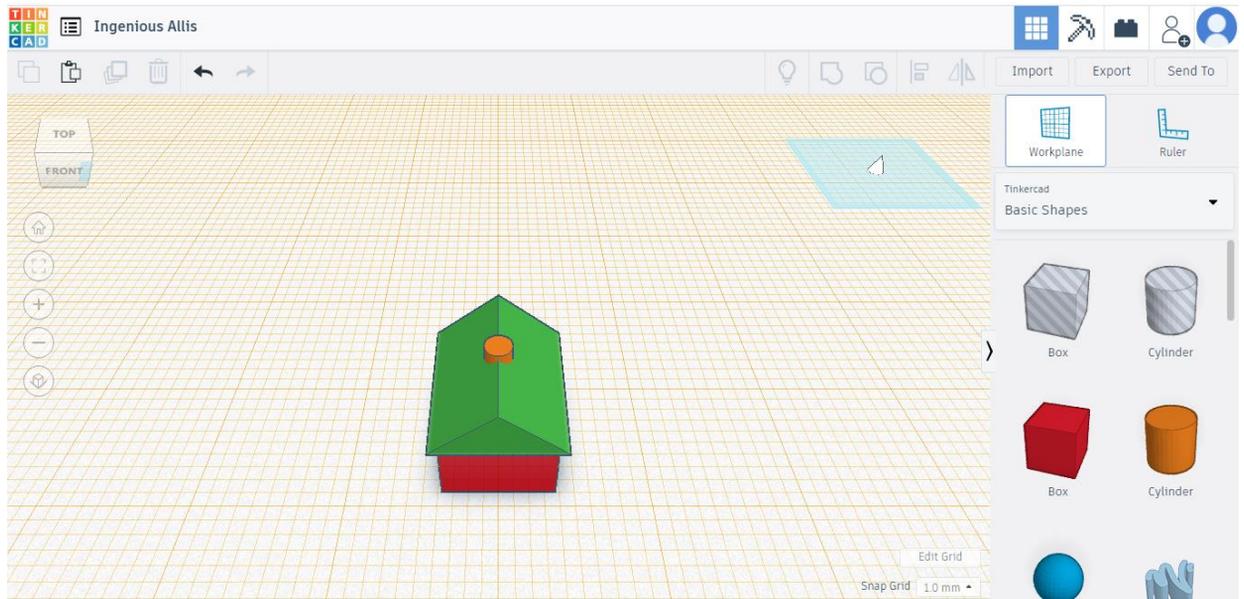
Step Four: Adding Roof

- Select the “roof” object from the basic shape tab and click anywhere on your newly created workplane.
- Length: 11.5
- Width: 10
- Height: 4
- The length of the roof should be even with the length of the box, but the width of the roof should hang over the box
- NOTE: If you have difficulty centering the roof, remember that you can change the snap grid to 0.25 (see step two)



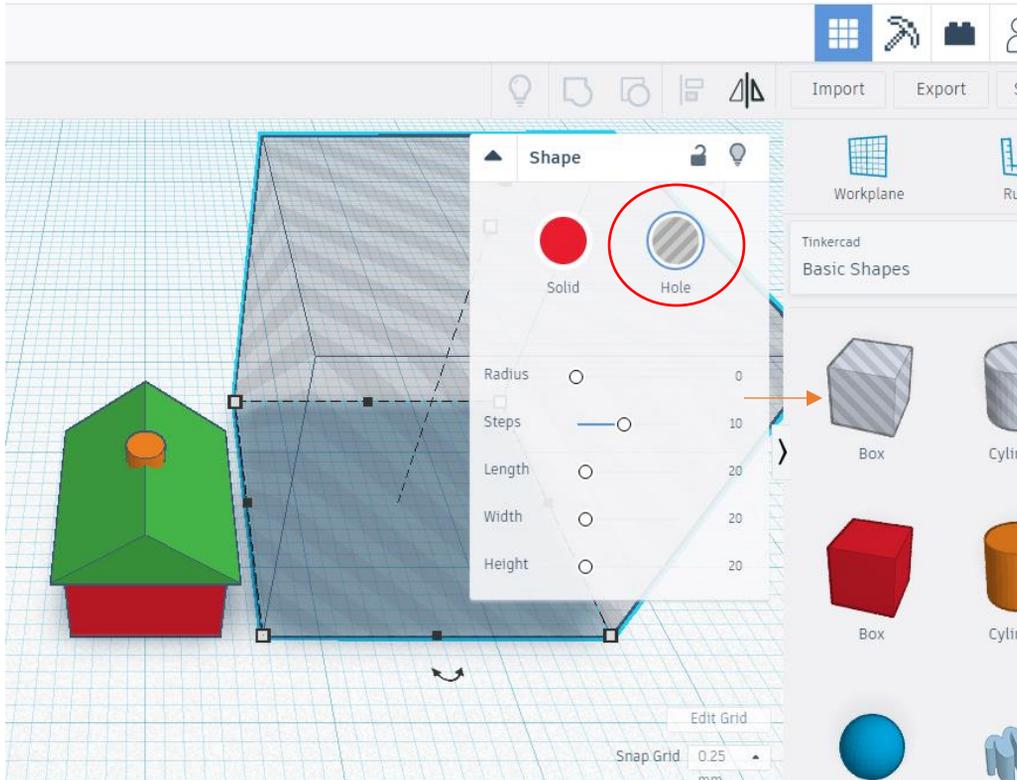
Step Five: Adding A Chimney

- Select “cylinder” from the basic shapes tab and click anywhere on the workplane (the same workplane from steps three and four) to create a cylinder.
- Length: 2
- Width: 2
- Height: 4.5
- We want the cylinder to be in the center of the roof; use the arrow keys to put it in place
- If you haven’t already, now would be a good time to adjust the camera orientation (see step one for details).



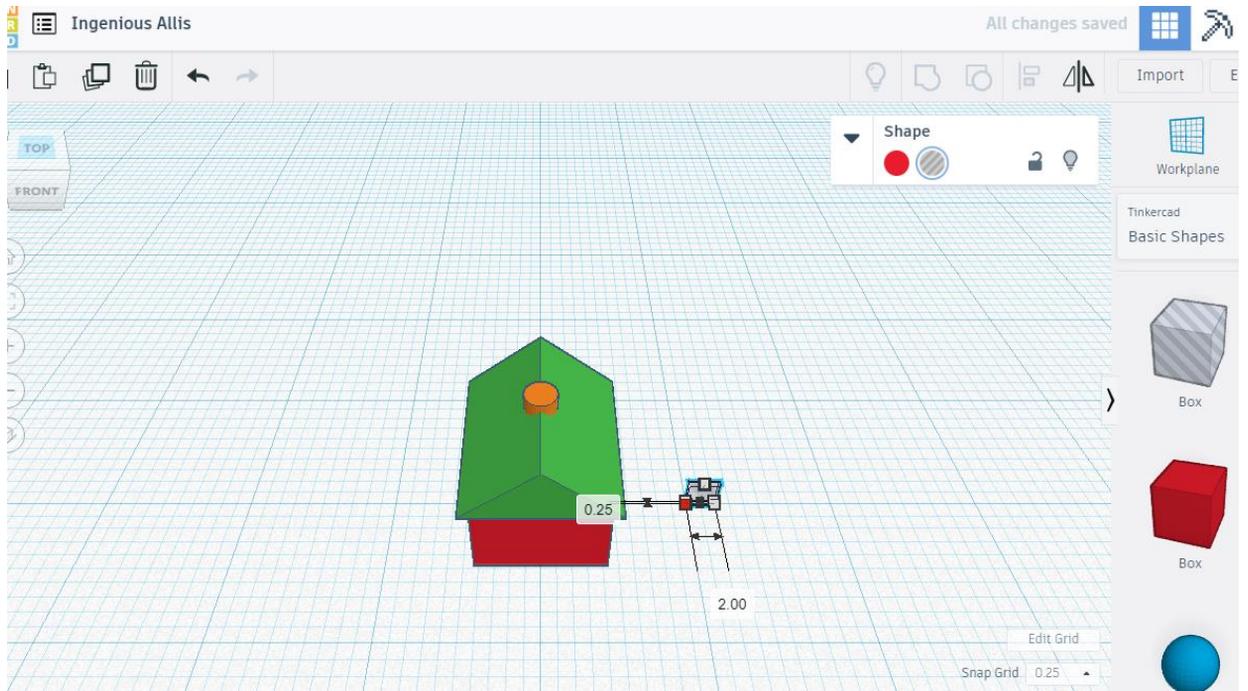
Step Six: Deleting Workplane

- Now that we've made the roof and chimney, we no longer need the workplane we created.
- To return to the original workplane, select the "workplane" option and then click anywhere away from your objects
- If the workplane is set to normal, the grid should turn blue again



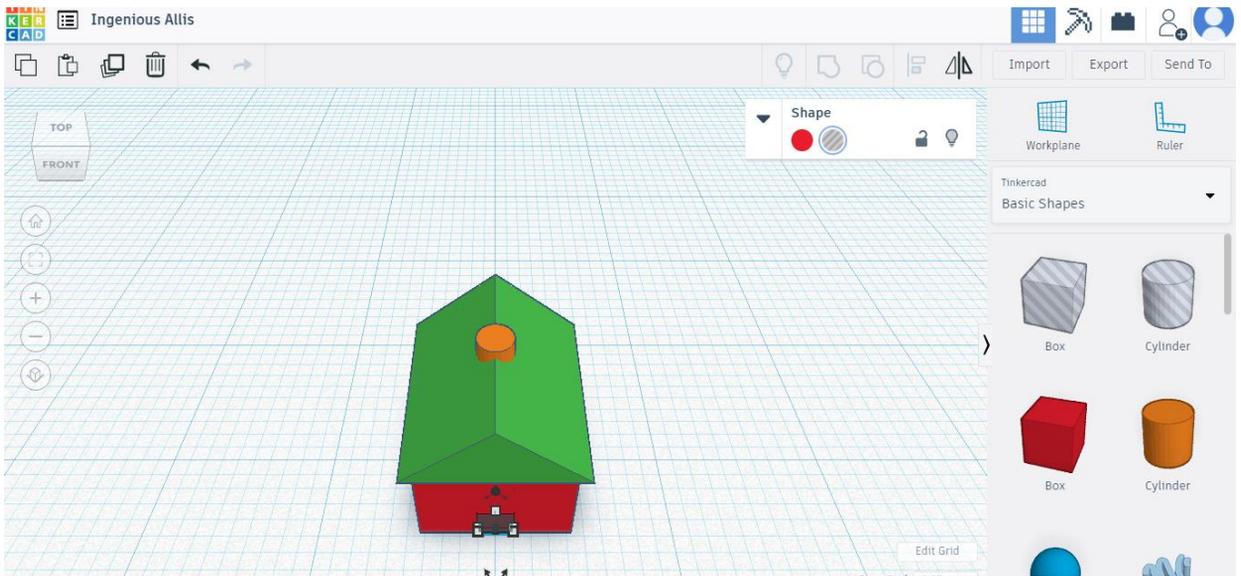
Step Seven: Creating Hole

- A hole is essentially negative space. If we think of regular, solid objects as “plus (+),” then hole assets are “minus (-).” We’re going to use a box hole to make a door.
- For most objects, you would bring them into the workspace like normal and then in the shape menu select the “hole” option, with grey stripes (see circle.)
- For boxes and cylinders only, you can also just select the greyed-out shapes at the top of the basic shapes list (see arrow).



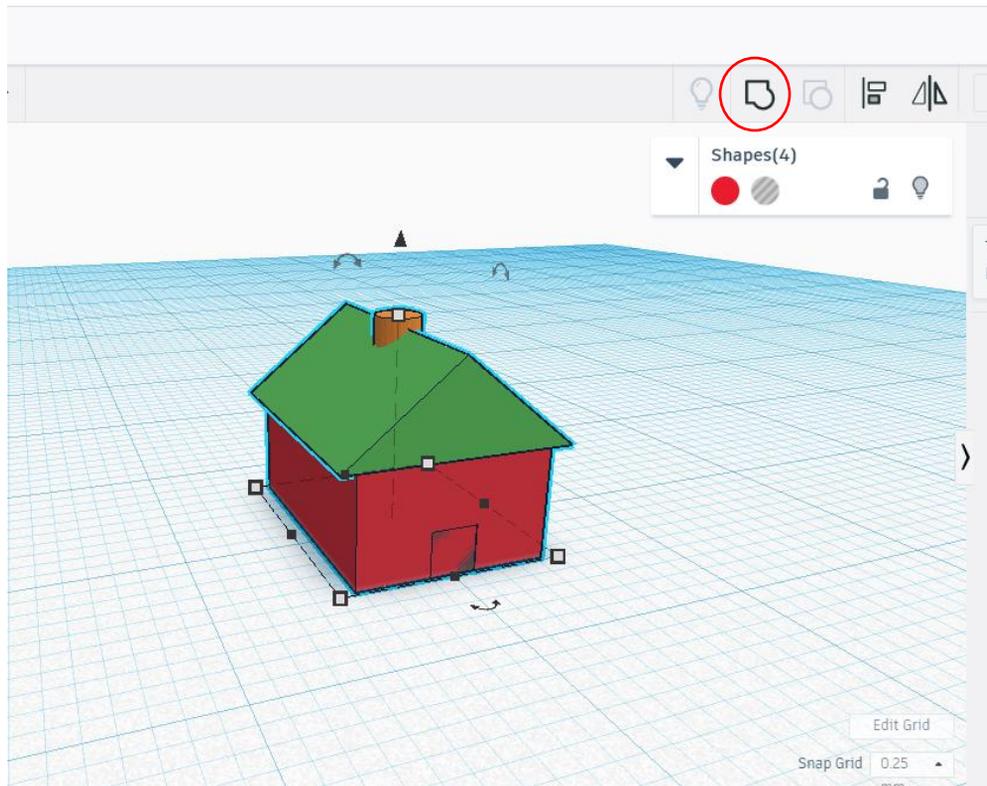
Step Eight: Sizing Door

- Now that we've created a hole, we can change its length, width, and height like any other object.
- Length: 0.25
- Width: 2
- Height: 2



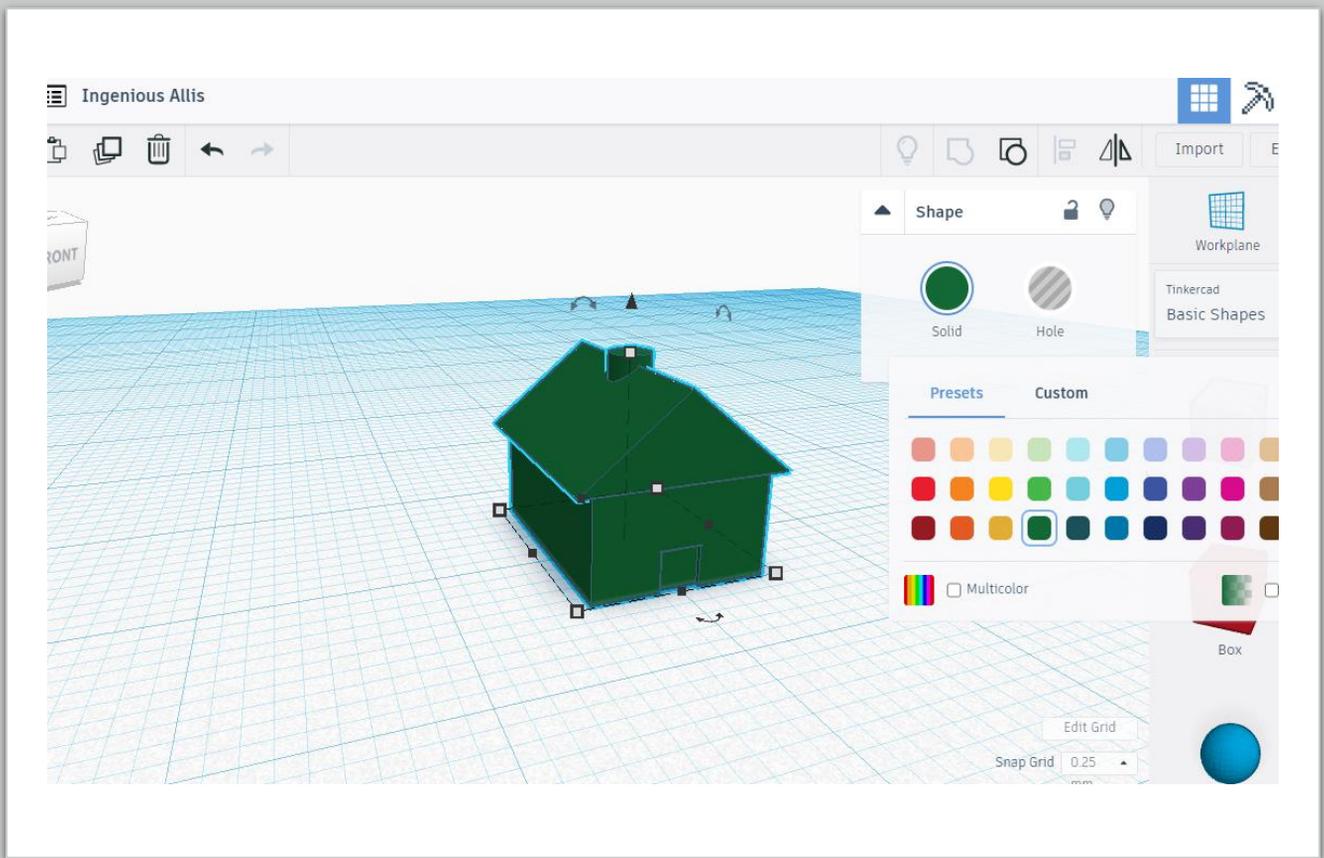
Step Nine: Placing

- NOTE: make sure snap grid is set at 0.25 (see step two)
- Move the hole in the front of the box. Use your arrow keys to move it in place. The hole should be just barely within the box. The best way to make sure the door is where it needs to be is to move it right up beside the front, and then move it inward just once by pressing the top arrow key once. Remember to adjust your camera if needed (see step one for details.)



Step Ten: Grouping

- Grouping is fusing multiple objects into a single object; this is essential if you are going to print.
- There are two ways to group:
- The first way is to click and hold your left mouse button, making a dotted red square. When you let go of the mouse button, all the objects within the red square will be selected. Then either click the group button (see circle) or use the key command “Ctrl + G” to group.
- The second way, if you have no extraneous objects in your workplace is to use the key commands “Ctrl + A” and “Ctrl + G.”



Step Eleven (Optional): Changing Color

- In case you want to change the color of your newly created house, go to the shape menu, click on the “solid” option, and select from the menu of colors that appears.
- Also, if you want to check your work to see if your design is printable, install Cura and run a preview of it. The details of Cura go beyond the scope of this guide, but there are other guides available to teach you how to use Cura.