

# Portal

## Level Creation Tutorial

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## Introduction:

**Prerequisites:** Install Portal through Steam and install the Source SDK. If you don't know where to get the Source SDK, you can get it by going to the tools tab in Steam, right clicking on "Source SDK", and choosing "Install Game"

## Procedure:

### Launching Source SDK

- 1.) Open the Source SDK by opening Steam, right clicking on Source SDK, and choosing Launch Game. Note: You have to have opened Portal at least once for this to work.
- 2.) Once the Source SDK opens, at the bottom make sure Engine Version is set to "The Orange Box" and Current Game is set to "Portal". Then, right click on Hammer Editor and choose "Launch"

### Creating a new map

- 1.) Go to File -> New to create a new map.
- 2.) Before we get started, right click on camera, in the top left of your upper left viewport and pick "3d shaded textured polygons"

### Creating a room (Hollowed box method)

- 1.) Choose the box tool (left side, it says "Block tool" or "Block creation tool" if you hover over it) and drag a rectangle in your Top view (top right viewport). Make it 1024x1024. Use the scroll wheel to zoom out if you need to. You can drag it around normally to position it, as well as scale it by pulling on the edge markers.
- 2.) Go to your front view (bottom left) and scale the height of your box to 512 units tall.
- 3.) Press enter to create your box.
- 4.) We need to make the box hollow so it has an interior. Go to the tools menu and pick Make Hollow. You can alternatively hit Ctrl-H. When prompted for a wall thickness, choose 16. This is an overall good value to use for wall thickness.
- 5.) To get a look at what you've created, tap Z when your mouse is in the perspective or camera viewport (upper left) and you will enter mouse look mode. Your mouse will control the camera direction, and you can navigate in 3d using the WASD keys. Tap Z to get back out of that mode
- 6.) Right now, your grid is every 64 units, which is kind of high. To change grid spacing, tap the open bracket key '[' on your keyboard. This will change the grid to 32x32 units. Then your wall thickness will be half a grid unit, which is fine.
- 7.) In order to proceed to the texturing section, select your box in the perspective viewport by changing to the selection tool (looks like a mouse icon on the top left) and pick Ungroup from the Tools menu. This will allow you to select each wall separately.

### **Creating a room (Separate walls and floors method)**

- 1.) (Delete your old box level if you created one above. Just click it in your perspective view and hit delete.) Choose the box tool like in step one above and draw a 1024x1024 box in the top viewport (top right viewport).
- 2.) Make sure your grid is set to 32 (see step 6 above) and make the height of your newly created box 32 units tall. Hit enter. You've just created the floor box.
- 3.) Go to your side view (bottom left viewport) and create a box 1024x1024, that overlaps your floor. In other words, your floor box should fill the bottom-most grid block of your new wall. Go to other viewports and make sure you have given your wall a 32 unit thickness. Press enter.
- 4.) Repeat the steps above to make 3 more walls and a ceiling.
- 5.) If you would like to save now, scroll down to the Saving section for information about saving. Remember you cannot test yet because there is no spawn point and no light.

### **Texturing walls**

- 1.) Choose all of the walls from the perspective viewport. We will change their texture. Control click on each wall to get all four selected. Remember to hit 'z' to lock into mouse look mode and look around. Alternatively you can use the arrow keys to look around.
- 2.) On the right side, next to the little texture icon, pick browse. At the bottom of the Textures window, type in the Filter box "concrete wall". Pick a nice wall texture by double clicking on the one you want.
- 3.) Now that you have a texture selected, and surfaces selected that you want to apply it to, click the Brick cube button located two below the box tool. If you mouse over it will say "apply current texture".
- 4.) Select your floor, then choose a floor texture by opening up the texture browser by hitting Browse and typing "concrete floor" into the filter box. Concrete\_modular\_floor\_001b is used often in Portal. Do the same with a ceiling, and type "concrete ceiling" into the filter box.

### **Creating Player and Weapon Spawns**

- 1.) Click on the entity tool. It looks like a white chess piece. It is just above the box tool.
- 2.) On the right side bar, at the bottom, Categories should say "Entities". Below that is a box that says "Objects:". In that box, type info\_player\_start. It will autocomplete for you, so just click on the right entry.
- 3.) Once info\_player\_start is filled in, go to the perspective viewport and click on the ground where you want the player start to be. He will automatically snap to the floor.
- 4.) Next type in weapon\_portalgun and click like before to place the portal gun spawn. If you would like the player to spawn with a portal gun instead of having them walk over to pick it up, move the portalgun to a location intersecting the player spawn, at stomach height. You will need to turn up your grid spacing to do this. Remember, press '[' to do that.

### **Adding Lights**

- 1.) Select the entity tool. For "Objects:" type "light". There are multiple types, but for now, just use 'light'.
- 2.) In the top view, click in the center of the room, to center it directly in the middle on the XY axis.
- 3.) In one of the side views, drag your light up to about 75 percent height of the room, so its near the ceiling, but not too close to it. Hit enter and you have a light.
- 4.) In the perspective view, double click on the light using the selection tool (the top tool on the left that looks like a mouse pointer) and it will open up the Properties.

- 5.) Name is already selected, so on the right side above the “Mark” button, type in “light1” or any name you wish.
- 6.) Click on brightness. The value right now will be 255 255 255 200. The first 3 numbers determine color. You don’t need to set color by memorizing the numbers. You can click “Pick color” to pick a color. I’m going to leave it white. The fourth number is the brightness. 200 is too low for a room of this size, so I’m going to change it to 500. Just change the 200 to a 500 and click Apply at the bottom. Close the properties window.

### **Saving and Testing**

- 1.) Now is a good time to save and test. Go to file and pick save. It will try to save by default in your steam installation directory/steamapps/username/sourcesdk\_content/portal/mapsrc . This is fine. Name your map and hit save.
- 2.) Go to file and pick Run Map. Leave it at default settings and hit OK. It will do light compilation and then launch portal to test your map.

### **Inserting a companion cube**

- 1.) Lets get some cool models into our map. Pick the entity tool and place a prop\_physics\_override. You should know by now to type “prop\_physics\_override” in the box under “Objects:”. Click where you want it to be placed.
- 2.) Go to the selection tool and double click your prop. In here you can set which mesh will be displayed.
- 3.) Go to World Model and hit Browse. Wait a while for it to open.
- 4.) In the Model Browser, make sure Mod filter is set to All Mods, at the top. Also click on MDL Files, below that (top of the list). Go to the bottom and next to filter, type metal\_box. Pick that and hit OK.
- 5.) Change Skin to 1 to have a companion cube, as opposed to the normal cube. Hit apply and make sure it’s not intersecting the ground.

### **Inserting a turret**

- 1.) Pick the entity tool and place a npc\_portal\_turret\_floor.
- 2.) Double click on it to go to its properties.
- 3.) Set “Damage pushes player” to Yes if you want the player pushed back by the turret.
- 4.) Under Flags, check Autostart and Fast retire. This will cause your turret to automatically start and retire fast (like the ones in Portal).

### **Making walls un-portalable**

- 1.) Create a box (also known as a brush). This box will define the non-portalability, and will go in front of a wall, so size it accordingly. Don’t forget to hit enter.
- 2.) Hit “Browse” on the texture browser and search for “no draw”
- 3.) Apply that texture to the whole brush using the brick looking box tool.
- 4.) Select the brush in selection mode and hit Ctrl-T. This will tie it to an entity. A window will open and you need to change the class to func\_noportal\_volume.
- 5.) You are done, but there is an important step that will help you later on. If you make a whole bunch of these no-portaling volumes, they will get in the way, so you can make a group for all of them, then hide and show them at will.
- 6.) To do this, go to the Map menu and pick Entity Report. Select all the func\_noportal\_volume items by picking that.
- 7.) Click the box on the top toolbar that looks like a red wireframe cube, the 13<sup>th</sup> from the left. That will make a new visgroup or visibility group for these items. You can toggle on and off that group by looking on the right side under VisGroups, in the user tab. It will be listed as whatever you named it when you created the group.

## Enable Developers Console

- 1.) Open Portal, go to options and choose Keyboard. In advanced, enable developers console.
- 2.) This allows you to launch downloaded or created maps with the command "map mapname"

## 1500-Megawatt Aperture Science Heavy-Duty Supercolliding Superbutton (Door control)

[Adapted and mostly stolen from [http://developer.valvesoftware.com/wiki/Creating\\_a\\_button\\_and\\_door](http://developer.valvesoftware.com/wiki/Creating_a_button_and_door)]

### Door

- 1.) Create two walls to separate off a part of the level. Leave space for a doorway.
- 2.) Add a prop\_static called door\_01\_frame\_reference
- 3.) Add a prop\_dynamic with model door\_01\_lftdoor\_reference and the 'Name' "door\_left\_model".
- 4.) Create a nodraw textured block in the door model (56Lx8Wx104H). Tie it to an entity (Ctrl-Y) and make the entity "func\_door". Change the following:
  - Name - door\_left
  - Speed - 250
  - Stop Sound - Doors.FullClose8
  - Delay before Reset - -1
  - Lip - 12
  - Move Direction - (This will be different for which way your door is facing)
  - Un-check 'Touch opens' under Flags.
- 5.) Repeat with right door
- 6.) Set the parent of door\_left\_model (the prop\_dynamic) to "door\_left". Also set the parent of door\_right\_model to "door\_right".

### Button

- 7.) Create a prop\_static with a World Model of "button\_base\_reference".
- 8.) Create a prop\_dynamic aligned on top of the prop\_static with the following settings:
  - |World Model - button\_top\_reference.mdl
  - |Name - button\_top\_model

### Movement

Next create a 58Wx59Lx9H cylinder brush with 8 sides and textured with nodraw. Move this brush right underneath your prop\_dynamic. Tie the cylinder to a func\_door with the following settings:

```
|Property Name |Value
|Name |button_top_door
|Speed |25
|Delay before Reset |-1
|Move Direction |90 0 0 (or Down)
```

Also make sure nothing is checked under Flags.

Set the Parent of button\_top\_model to be "button\_top\_door".

## Triggers

The larger trigger\_multiple.

1. Create a 48Wx48Lx1H block brush with trigger texture applied. Place it right on top of the button\_top\_model. Tie this brush to a trigger\_multiple with the following settings:

|Property Name |Value  
|Name |button\_trigger\_player

We will set up the Output later. Also make sure to only have the flag: Client set.

The smaller trigger\_multiple.

2. Next create a 7Wx7Lx1H cylinder brush with 8 sides and textured with trigger texture applied. Put this brush directly on top and in the center of the button\_top\_model and tie it to a trigger\_multiple with the following settings:

|Property Name |Value  
|Name |button\_trigger\_box

And only the following Flags are checked:  
Physics Objects

We will set up the Output later.

3. Create a filter\_activator\_name nearby your button with the following settings:

|Property Name |Value  
|Name |button\_filter\_boxes  
|Filter Name |(The name your box entity has)

4. Select your button\_trigger\_box trigger and set the Filter Name to "button\_filter\_boxes".

5. Create two ambient\_generic entities and give one the following settings:

|Property Name |Value  
|Name |button\_down  
|Sound Name |Portal.button\_down  
|Source Entity Name |button\_top\_model

and the other with

|Property Name |Value  
|Name |button\_up  
|Sound Name |Portal.button\_up  
|Source Entity Name |button\_top\_model

6. Now go back and select the cylinder func\_door brush under the button, "button\_top\_door" and setup the Outputs as below:

	My Output	Target Entity	Target Input	Parameter	Delay	Only Once
🔗	OnClose	door_left	Close	<none>	0.00	No
🔗	OnClose	door_right	Close	<none>	0.00	No
🔗	OnClose	button_up	PlaySound	<none>	0.00	No
🔗	OnOpen	door_left	Open	<none>	0.00	No
🔗	OnOpen	door_right	Open	<none>	0.00	No
🔗	OnOpen	button_down	PlaySound	<none>	0.00	No

7. Select the larger trigger\_multiple, "button\_trigger\_player" and setup the Output as below:

	My Output	Target Entity	Target Input	Parameter	Delay	Only Once
🔗	OnEndTouchAll	button_trigger_box	Enable	<none>	0.00	No
🔗	OnEndTouchAll	button_top_door	Close	<none>	0.00	No
🔗	OnStartTouch	button_trigger_box	Disable	<none>	0.00	No
🔗	OnStartTouch	button_top_door	Open	<none>	0.00	No

8. Select the smaller, cylinder trigger\_multiple, "button\_trigger\_box" and setup the Output as below:

	My Output	Target Entity	Target Input	Parameter	Delay	Only Once
🔗	OnEndTouchAll	button_trigger_player	Enable	<none>	0.00	No
🔗	OnEndTouchAll	button_top_door	Close	<none>	0.00	No
🔗	OnStartTouch	button_trigger_player	Disable	<none>	0.00	No
🔗	OnStartTouch	button_top_door	Open	<none>	0.00	No

9. Finally, create a light entity underneath the top of the button but still inside the base. Give it the following properties:

|Property Name |Value

|Brightness |251 159 57 30

|BrightnessHDR |251 159 57 20

### More awesome tutorials

- Making glass - [http://tutorial-portal.net/gamedev/tutorials/hammer\\_glass.php](http://tutorial-portal.net/gamedev/tutorials/hammer_glass.php)
- Making water - [http://tutorial-portal.net/gamedev/tutorials/hammer\\_water.php](http://tutorial-portal.net/gamedev/tutorials/hammer_water.php)
- Making ropes - [http://tutorial-portal.net/gamedev/tutorials/hammer\\_ropes.php](http://tutorial-portal.net/gamedev/tutorials/hammer_ropes.php)
- Making GLaDOS speak - [http://developer.valvesoftware.com/wiki/Making\\_GLaDOS\\_speak](http://developer.valvesoftware.com/wiki/Making_GLaDOS_speak)

- Making a security camera - [http://developer.valvesoftware.com/wiki/Creating\\_a\\_security\\_camera](http://developer.valvesoftware.com/wiki/Creating_a_security_camera)
- List of models from Portal - [http://developer.valvesoftware.com/wiki/List\\_of\\_useful\\_Portal\\_models](http://developer.valvesoftware.com/wiki/List_of_useful_Portal_models)
- Creating moving platforms - [http://developer.valvesoftware.com/wiki/Creating\\_a\\_moving\\_platform](http://developer.valvesoftware.com/wiki/Creating_a_moving_platform)
- Importing custom made textures - <http://www.iwannamap.com/viewtutorial.php?tut=28171>