Dice in Google SketchUp

A die (the singular of dice) looks so simple. But if you want the holes placed exactly and consistently, you need to create some extra geometry to use as guides. Plus, using components for the holes is a huge time-saver.



This project will work in any version of SketchUp, including the recently-released SketchUp 8.

For this project, it helps to have some basic knowledge of Google SketchUp (though detailed instructions are provided). In particular, it's important to know how to zoom, rotate, and pan the view. If you need more information on how to get started, and a description of some basic tools, please read 3DVinci's Getting Started Guide (PDF).

PC users: go to <u>http://www.3dvinci.net/SketchUp_Intro_PC.pdf</u>. Mac users: go to <u>http://www.3dvinci.net/SketchUp_Intro_MAC.pdf</u>.

Step 1: Set Up the Cube

1. Open Google SketchUp. If your file contains a person standing on the ground near the origin, click the **Eraser** tool and erase him.



2. Switch to **Top** view (from the main menu, choose **Camera / Standard Views / Top**). You should see the word "Top" at the top left corner.



3. To make the basic die shape (a cube), we'll start with a square. Click the **Rectangle** tool, click the first corner of the rectangle, and click the second corner when you see the "Square" popup. In the lower right corner of the SketchUp window, the **Dimensions** field shows the square's width and height.



4. We want to change the dimensions of the square to something easy to remember, so we can use that same number when we pull the square up to make the cube. So type something easy like 100,100 (don't forget the comma between the two numbers), and those numbers appear in the **Dimensions** field. (Don't click in this field, just type and the numbers will appear.)

Dimensions	100,100
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5. Press Enter, and the square resizes to fit the new dimensions. (If your square becomes too large or too small, you can always get it back in view by choosing **Camera / Zoom Extents** from the main menu.)

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Dimensions	100,100	

6. Now click the **Push/Pull** tool, click the square face, and move the cursor up. Type 100 and press Enter (or whatever number you used for the square dimensions), and you'll get a perfect cube with all edges the same length.



7. To set the locations for the holes on each face, we'll create identical offset squares. Click the **Offset** tool, and move your cursor to any of the cube faces. The entire face highlights, and you'll see a point along one of the edges marked in red.



8. Click once to select the face, then move the mouse inward until you see a square within the square, as shown below. Make sure the new square is well inside the face, not too close to the edge. Click again to finish.



9. We want the same offset square to appear on five faces of the cube (all faces but one). So with the **Offset** tool still active, *double-click* on four more faces. This creates offset squares that use the same offset distance you used before.



Step 2: Make a Hole Component

We'll start with one hole, then make that hole into a component to use on the other faces.

1. Click the **Circle** tool.



2. This first hole will go on the face that contains only one hole, so the hole must be at the center. We'll use the square that has no offset square inside it. To find the center of this face, place your mouse (don't click) and hover for a second each on the two midpoints shown below.





3. The move your mouse to where the center should be, and click when you see helper lines coming from the two midpoints you hovered on. This places the center of the circle.



4. Click again to make the circle the size you want. Don't make it too large, since some faces will have five or six holes.



5. If you want all holes to have a different color than the cube itself, click the **Paint Bucket** tool and paint the circle. Then use the **Push/Pull** tool to push the circle in just a bit.



6. We'll now make this hole into a component. First, activate the **Select** tool. Then place your mouse somewhere to the left of the hole, and drag a selection window that goes just around the hole itself, enclosing the entire hole but nothing else.



7. The entire hole should now be selected. Right-click on any selected face, and choose Make Component.



8. In the **Create Component** window, assign a name (such as "Dot"), and make sure **Cut Opening** is checked (it should be by default). Before completing the component, click **Set Component Axes**.

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9. We want the origin of the component to coincide with the center of the hole, but right now the origin is below and to the left of the center. So the first click should be at the center of the hole, which isn't easy to find just yet. To "remind" SketchUp of the hole's geometry, first hover over any point of the front of the hole.



10. Then move your cursor to the hole's center, and click when you see the "Center" popup.



11. The next click sets the red direction of the component. Set the red to match the current red direction.



12. The **Create Component** window returns. Make sure **Replace selection with component** is selected, and click **Create**.

Create Component 🛛 🛛 🔀				
General				
Name:	Dot			
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13. The hole is now a component, and is surrounded by a blue bounding box. This means it's selected; you can right-click in blank space to unselect it.

14. To see where the component is "stored" in your model, go to the main menu and choose **Window** / **Components**, which opens the **Components** window. Click the house icon, which displays all components in your model. Your hole component should be listed there.



Step 3: Add the Remaining Holes

1. Next we'll complete the two-hole face. First, click the component thumbnail (small picture) in the **Components** window. Then, click the corner point shown below, on the offset square. Because the hole's center point coincides with its origin, you can place its center right at the corner.



2. Then place another hole at the opposite corner of the offset square.



3. That face is done - all that's left to do is erase the offset square.



4. Next comes the three-hole face. For the hole at the center, we could either use the midpoint-hovering method, or to make things easier we can add a temporary line whose midpoint we can use. Click the **Line** tool and draw a line between opposite corners of the offset square.



5. Now bring in three holes from the **Components** window, one at a time, placing them at the ends and midpoint of that diagonal line.



Of course, if you're good at using the **Move** tool to make copies, you only need to place one hole, then make copies for the rest.

6. Then erase the offset square.



7. If you pay attention to a die, you'll notice that the number of holes on opposite faces add up to seven. So for the four-hole face, be sure you're placing the holes directly opposite the three-hole face. This one is easy: place one hole at each corner of the offset square. Then erase the offset square.



8. For the six-hole face, which should be opposite the one-hole face, place a hole at each square corner and two more at midpoints.



9. For the final face, with five holes, use all four square corners plus the midpoint of an added diagonal line.





Try This

If you read my blog, you might have seen my write-up on the Round Corner plugin. (See <u>http://3dvinci.blogspot.com/2010/10/round-corner-plugin.html</u> or go to www.3dvinci.blogspot.com and find the entry dated October 14, 2010.) Here's how my die looks like with smooth, round corners:



If you try this project with your children or students, and have an interesting die, or other game piece model you'd like to share, please let me know! I will be happy to blog about it, and possibly mention it in an upcoming newsletter. Contact me at bonnie@3dvinci.net. Thanks!