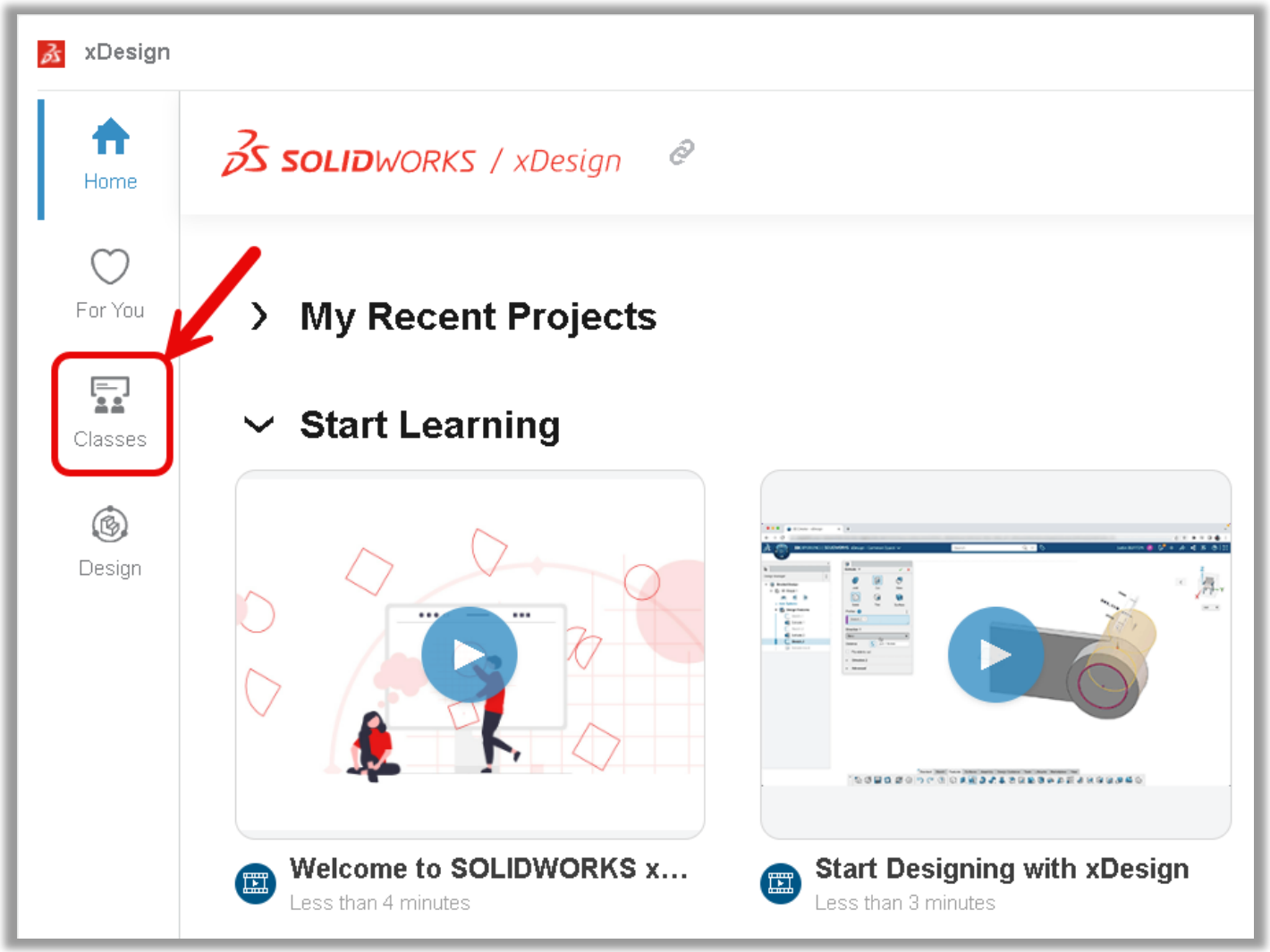
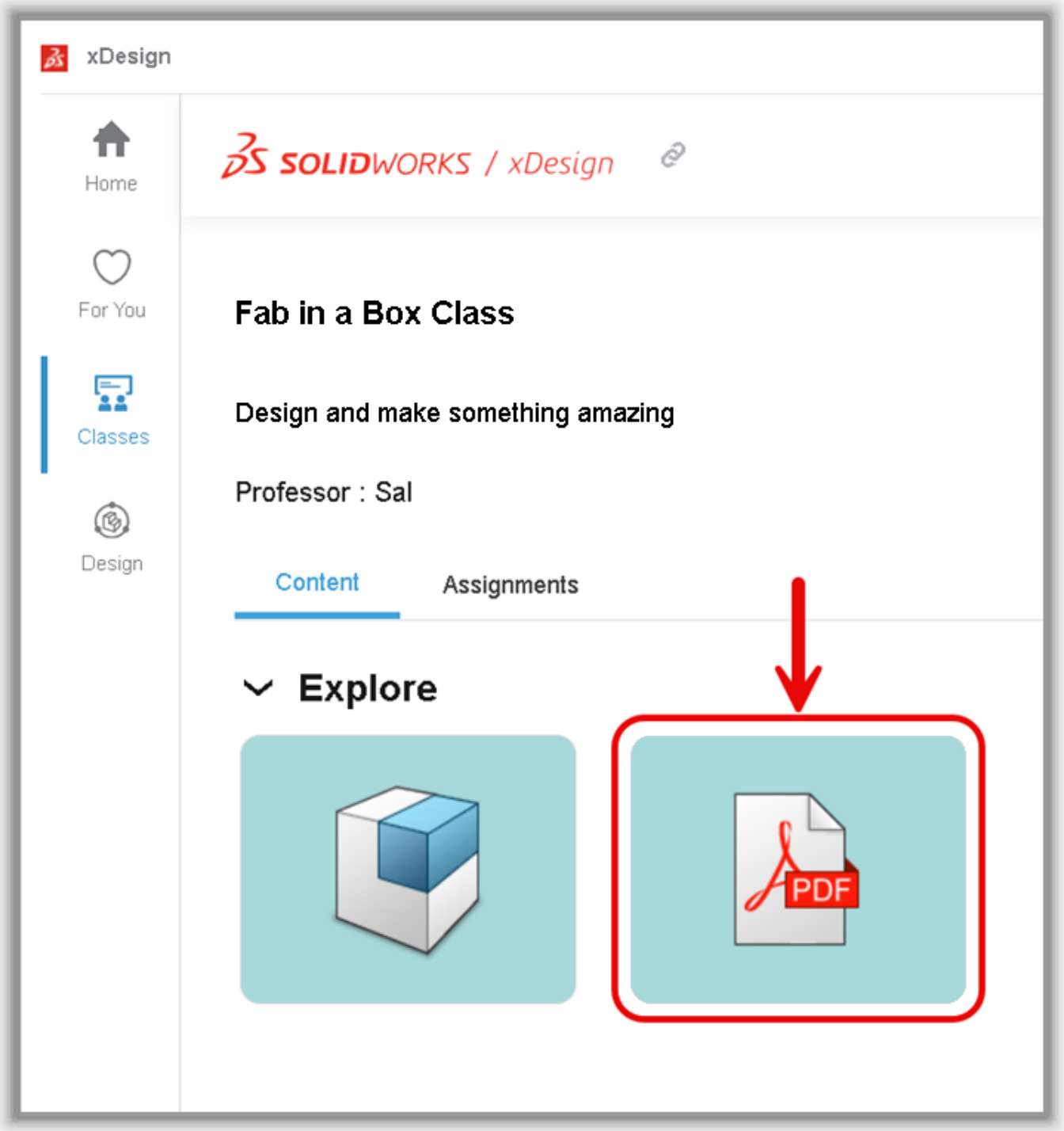
Design and fabricate your own trick dice.

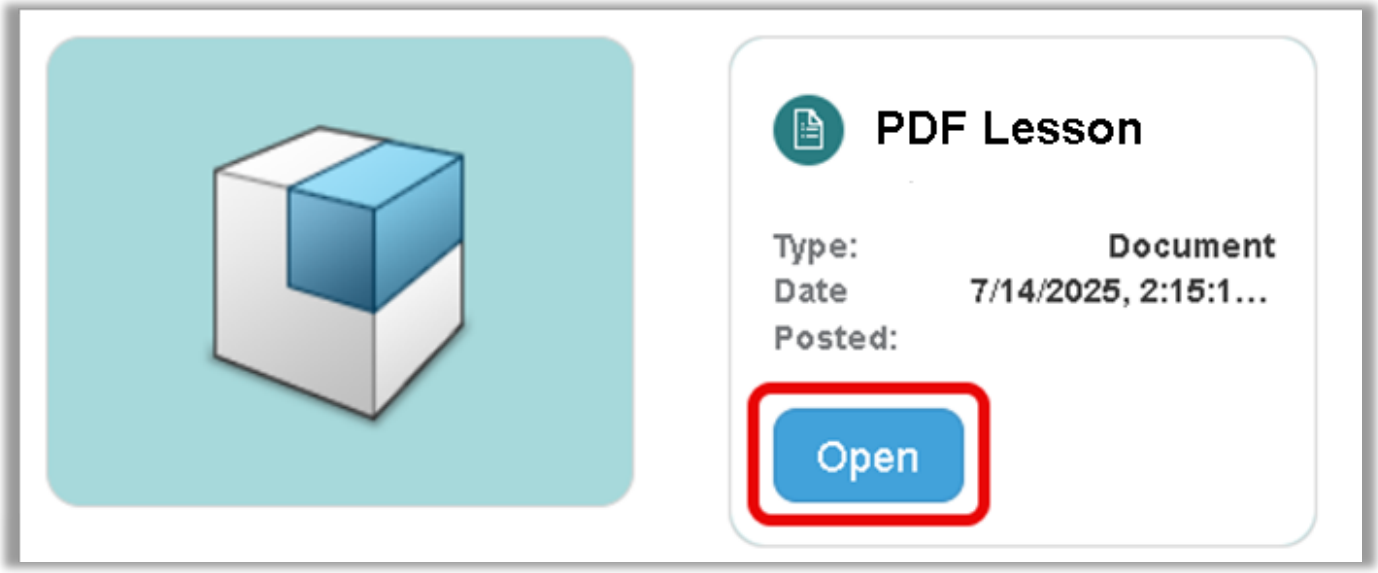
1. Click the **Classes** tab



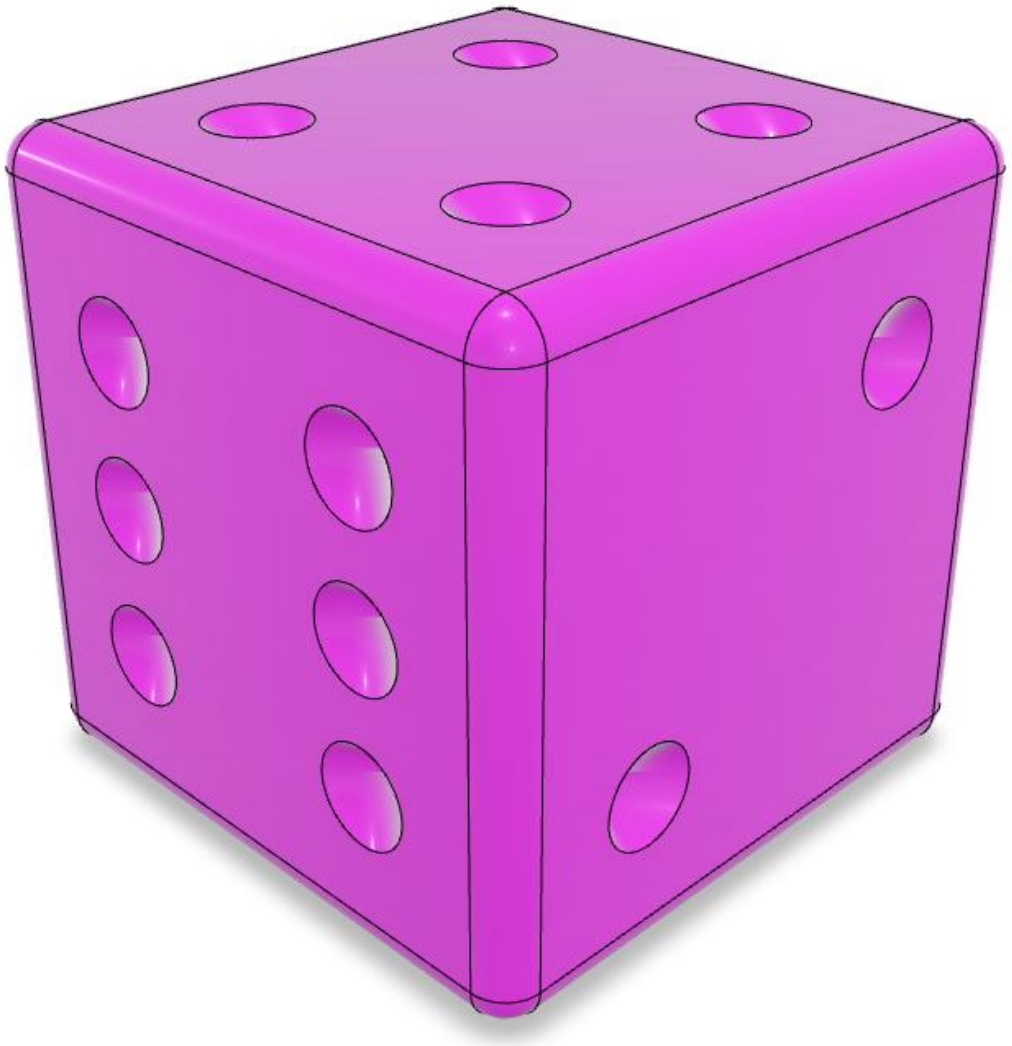
2. Hover over the PDF tile



3. Click **OPEN**

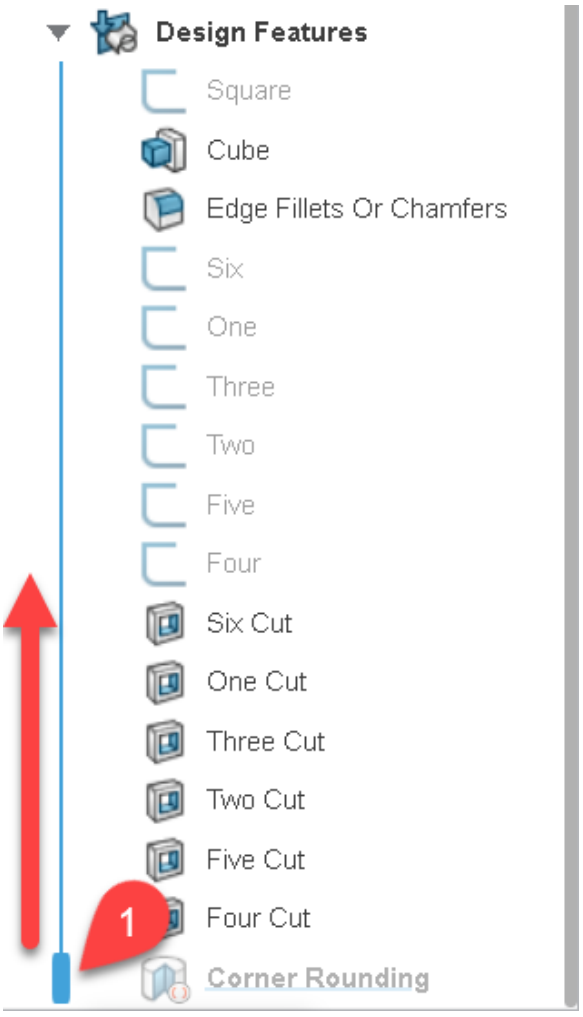


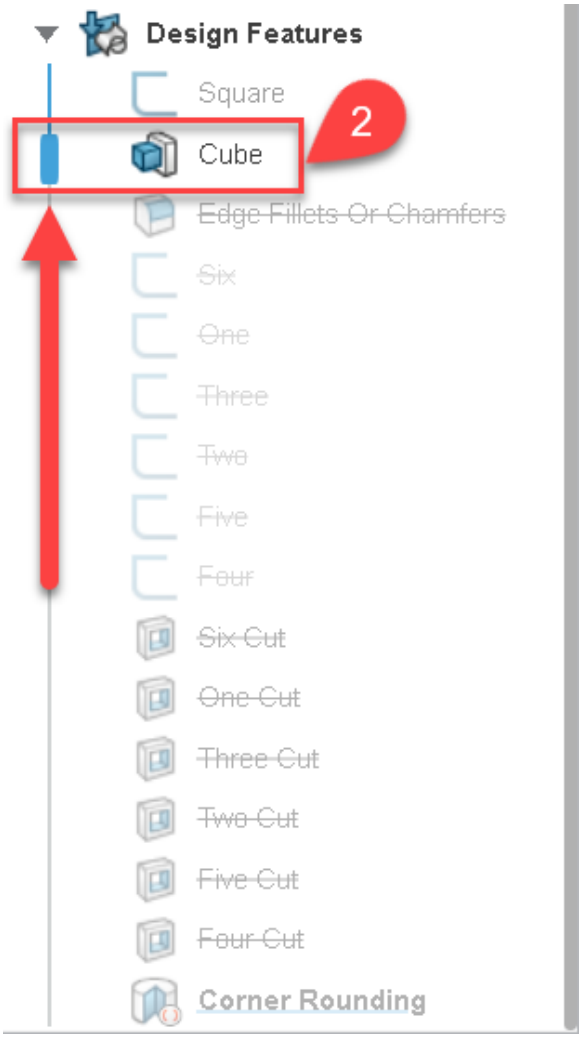
4. Open a die model that you previously created, or complete the first 6 steps of the 3DPrintedDiceExpose lesson to create a copy of the template to work with. Your die will look something like this:



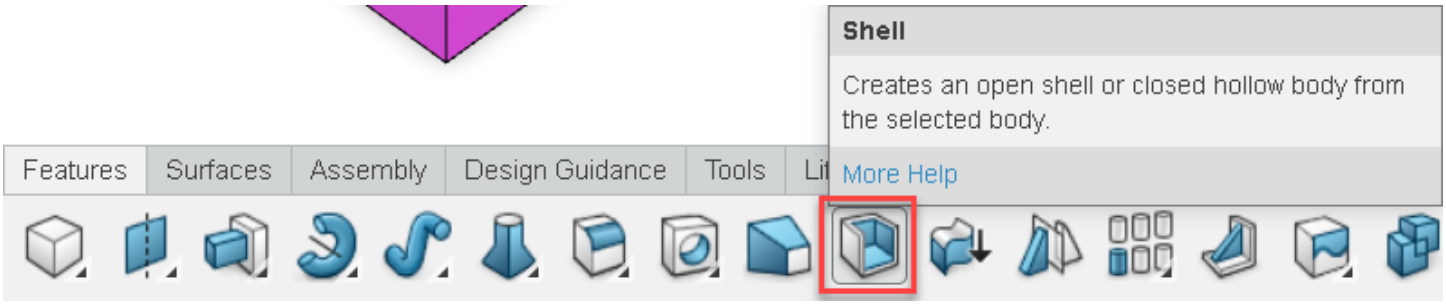
5. [1] Drag the blue handle of the Rollback Bar upward in the Design Manager and [2] drop it when it lines up with the “Cube” feature

NOTE: The rollback bar allows you see your model before certain features have been created. Any new features you create while in “rollback mode” will be inserted at that specific point (vs. the default location at the bottom of the feature tree when the rollback bar is docked to the bottom)

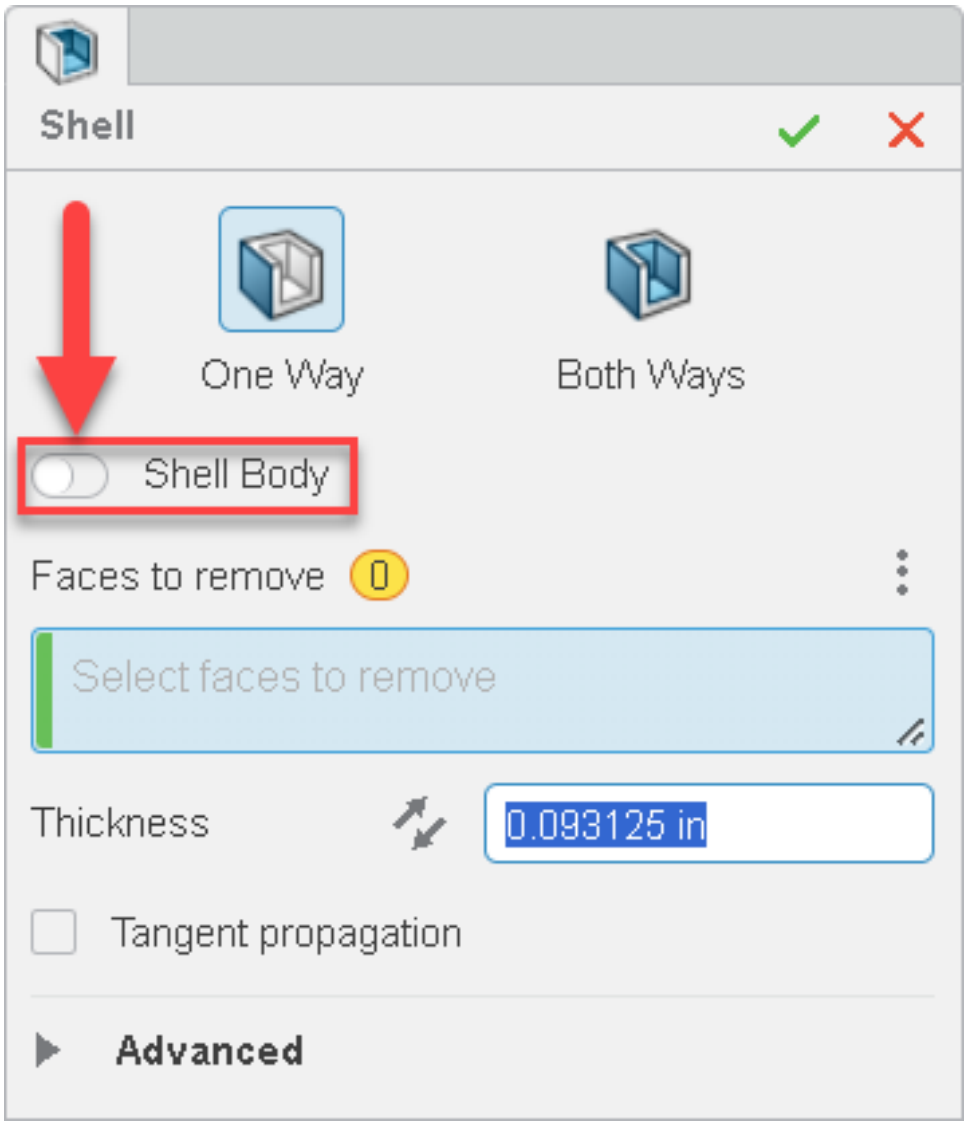




6. Start the **Shell** command on the “Features” tab of the Action Bar

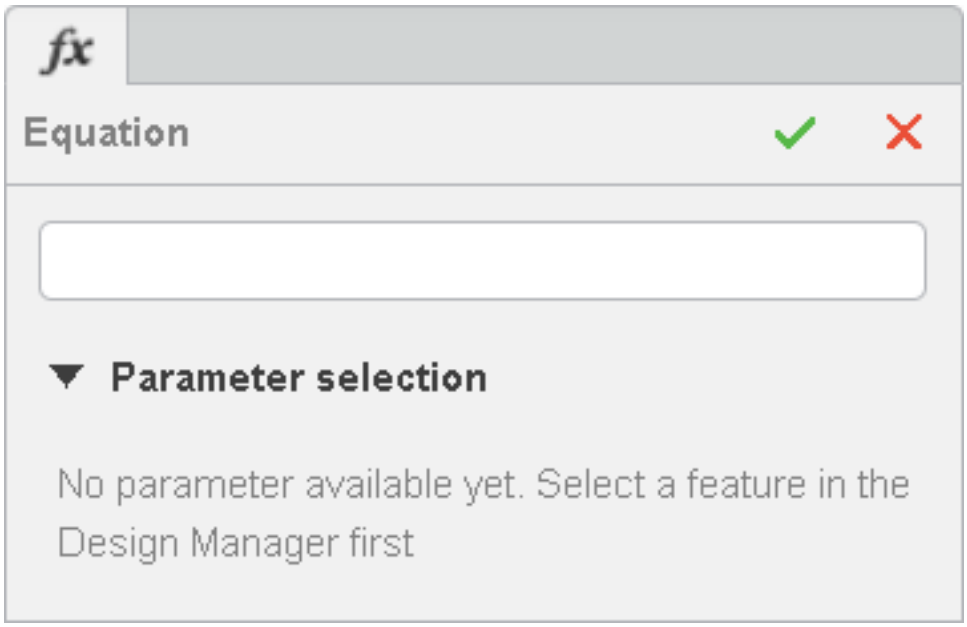


7. Click the “Shell Body” option

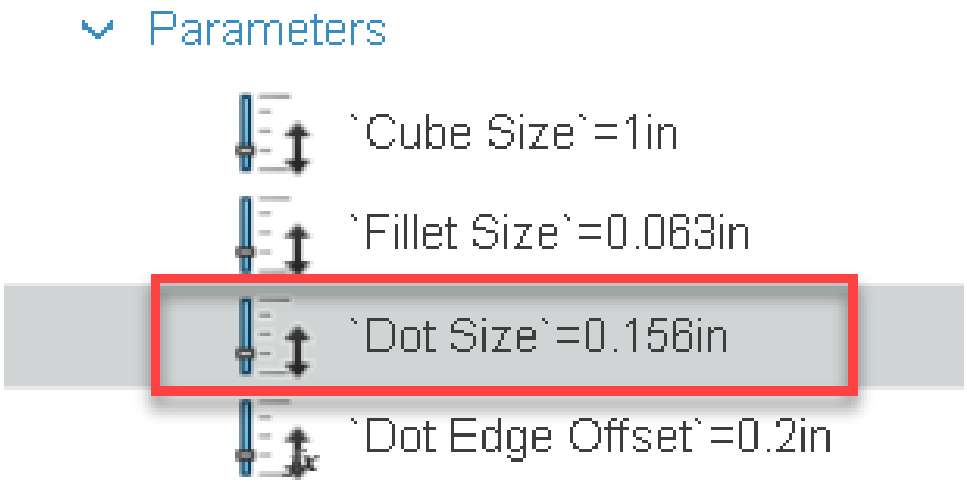


8. Select anywhere on the cube in the graphics area

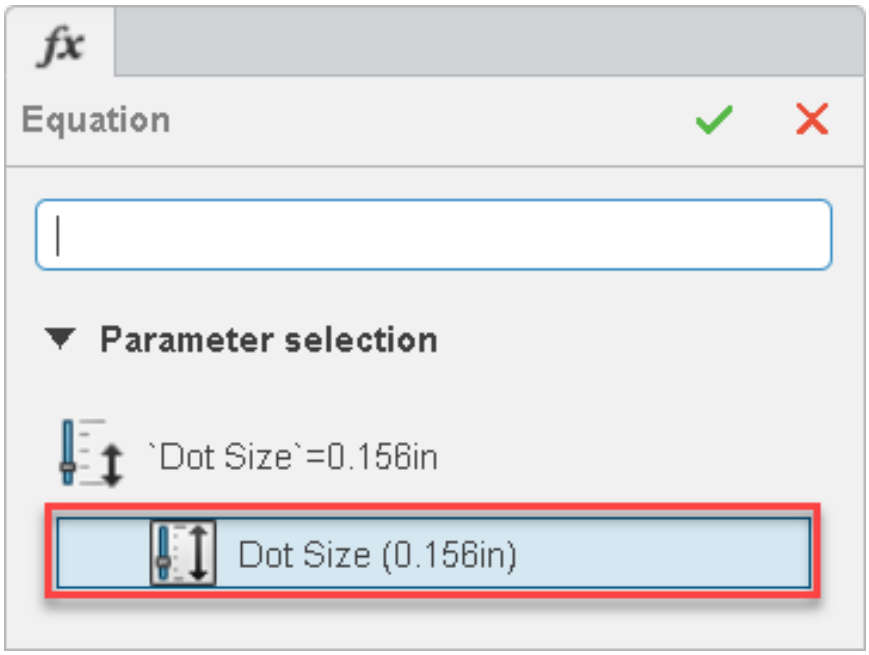
9. Click in the thickness field and type an equal sign = --- this will bring up the Equation dialog



10. Click the “Dot Size” parameter in the Design Manager



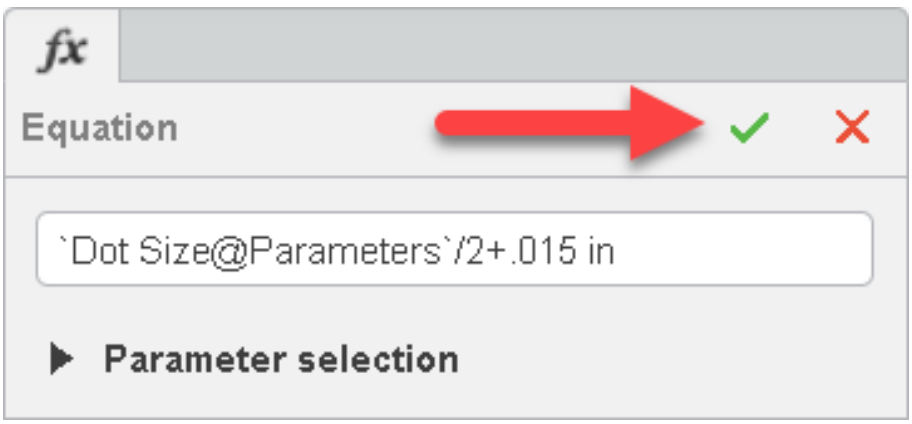
11. Click the “Dot Size” parameter in the Equation dialog to enter it into the equation field



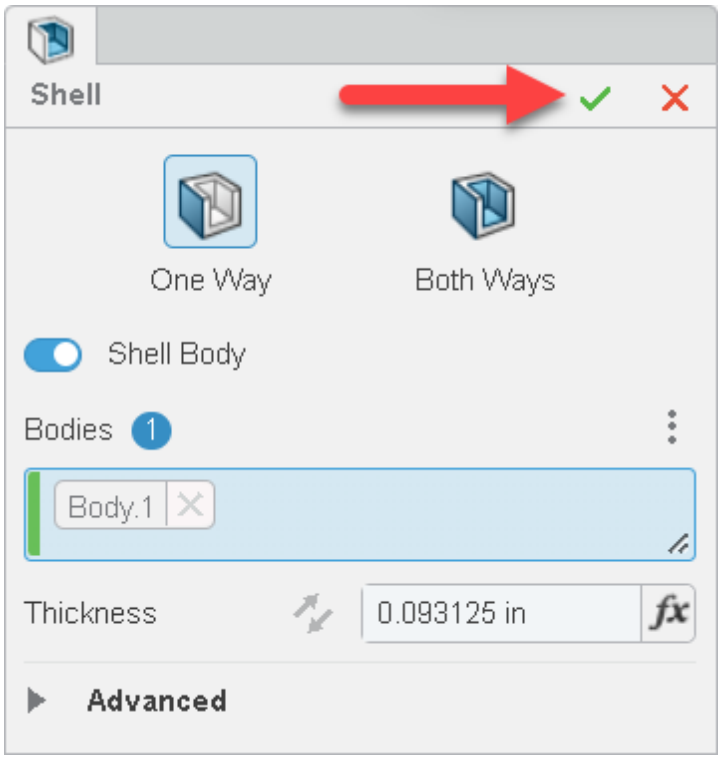
12. Type the following text in the equation field just after the parameter name (be sure to include the “in” units at the end):

/2+0.015 in

13. When your equation looks like this, click the **OK** checkmark

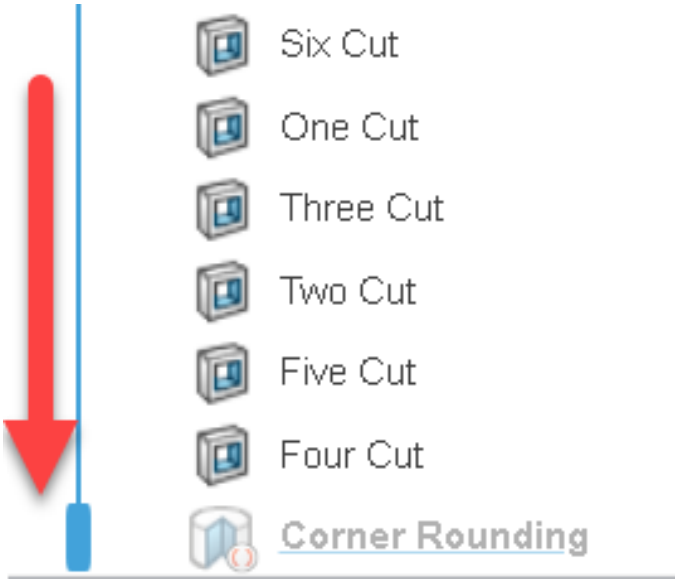


14. Click the **OK** checkmark in the Shell dialog to complete the command

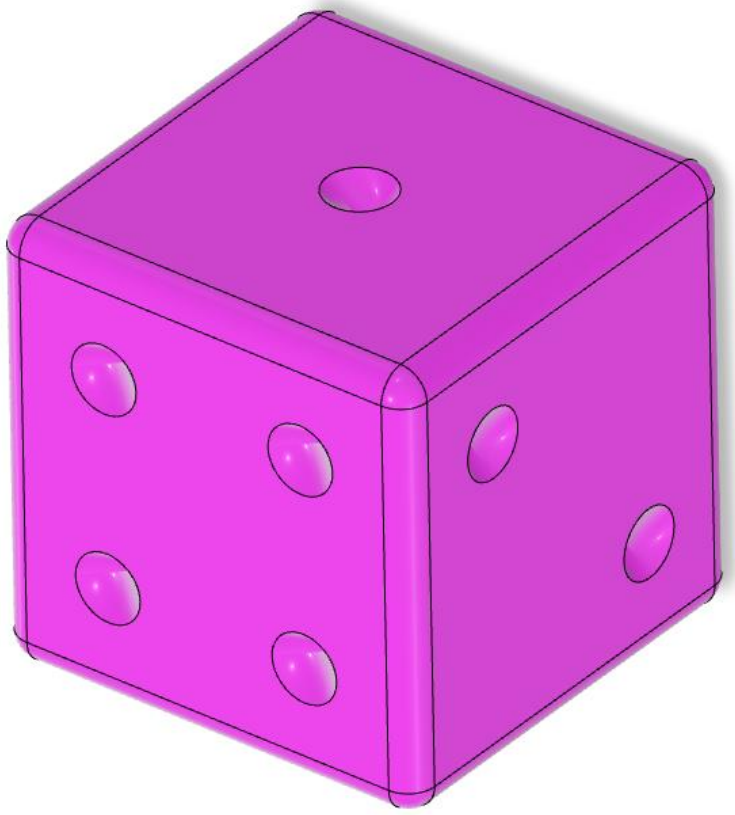


---your model is now hollow, but it's hard to see the result

15. Drag the Rollback Bar down to the bottom of the Design Manager

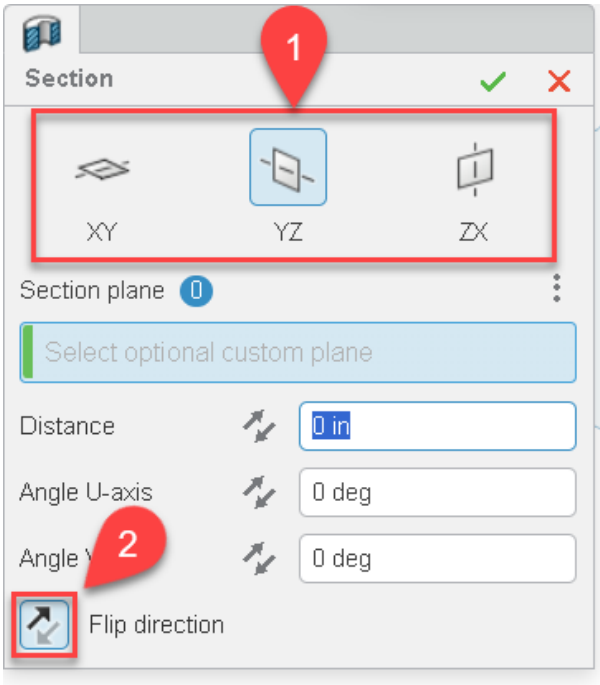


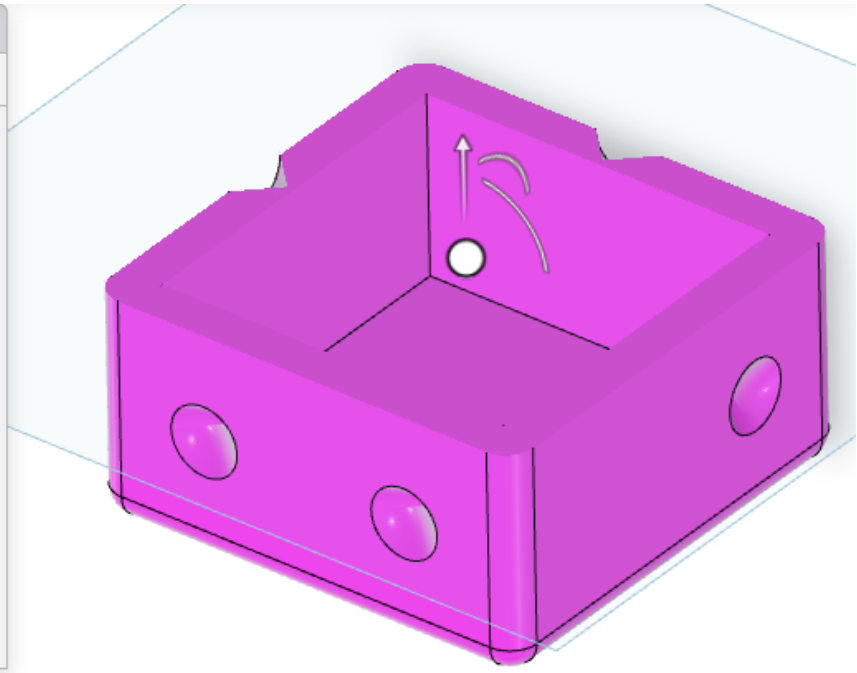
16. Decide which numbered side you want to add weight to, and rotate the model so it is facing down – In this example, we want the 1 to have a higher chance of landing face up, so we'll orient the 6 facing down



17. Click the **Section View** command on the "View" tab of the Action Bar

18. [1] Select the different default planes until you find the one that sections the model parallel to the numbered face you oriented on the bottom. If necessary, [2] use the “Flip direction” toggle to create a section view similar to this:



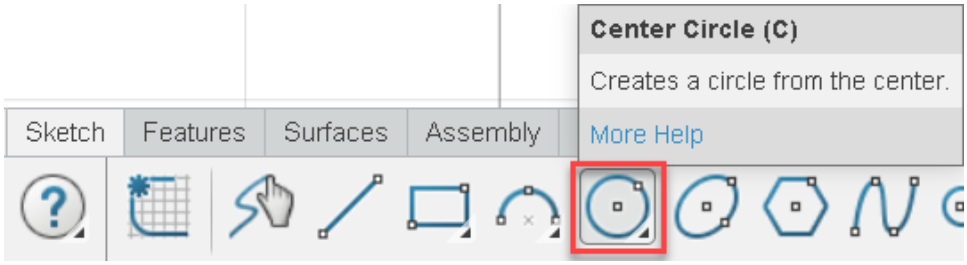


19. Click the OK checkmark to complete the Section View command

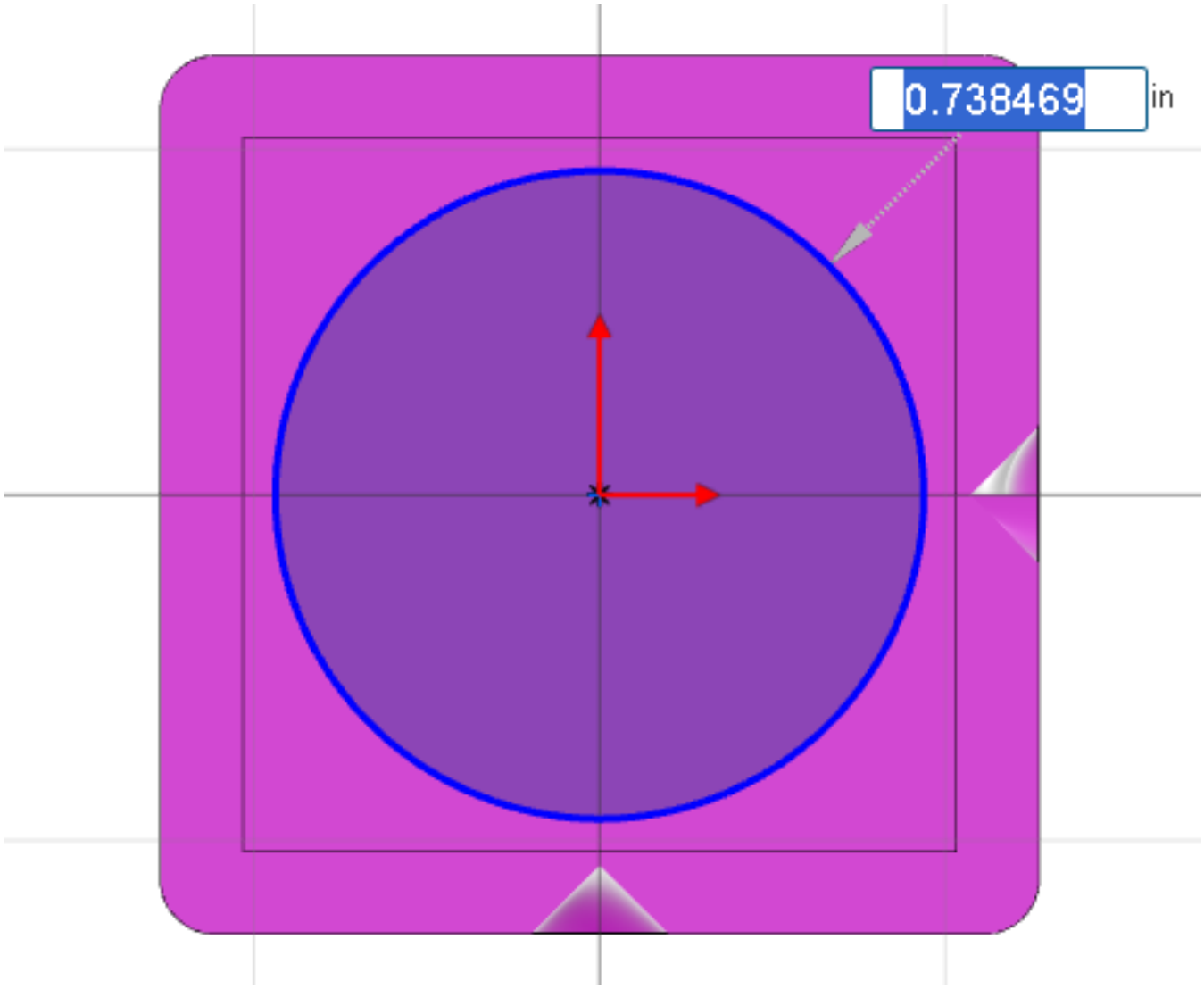
20. [1] Select the inner, bottom face of the die, and then [2] select “Create Sketch” from the context menu

--- xDesign will automatically orient your model so you are looking straight at the sketch

21. Click the **Circle** tool on the Action Bar

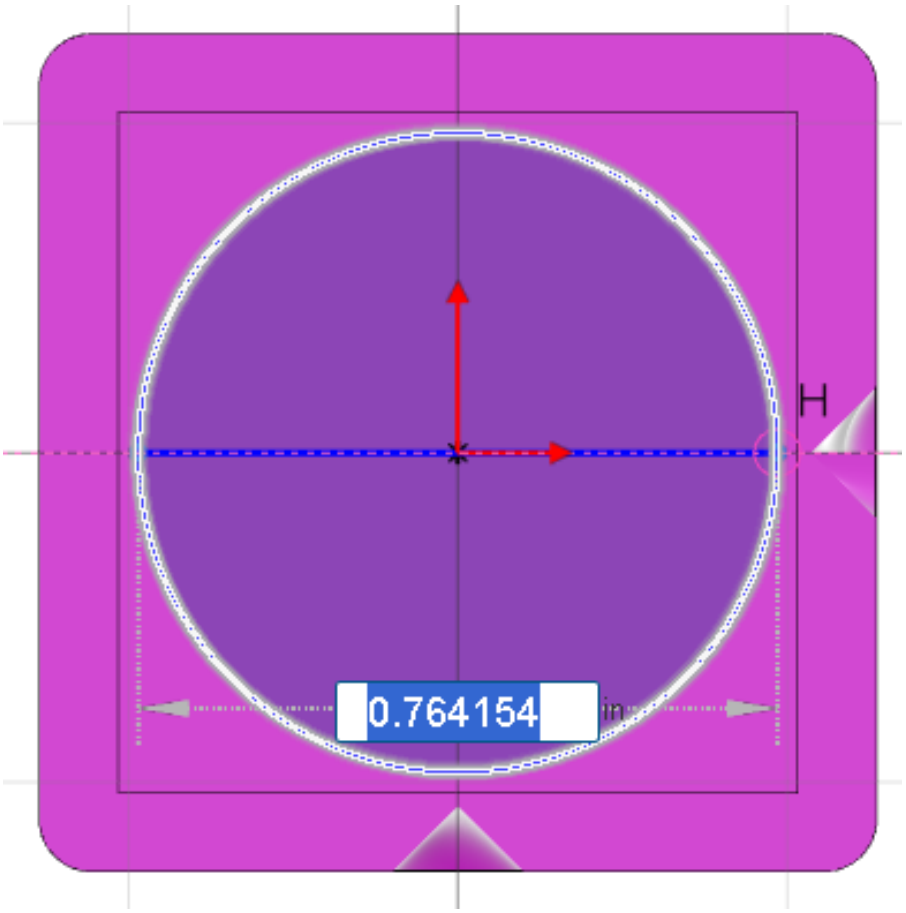


22. Click the origin to place the center of the circle and then move your mouse outward until the circle is just smaller than the inside walls of the die. Click to finish drawing the circle.



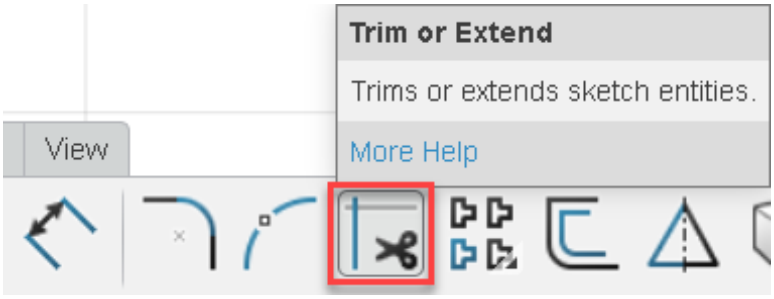
23. Press “L” on the keyboard (this is the shortcut for launching the “Line” tool)

24. Draw a horizontal line that goes completely across the circle and crosses the origin

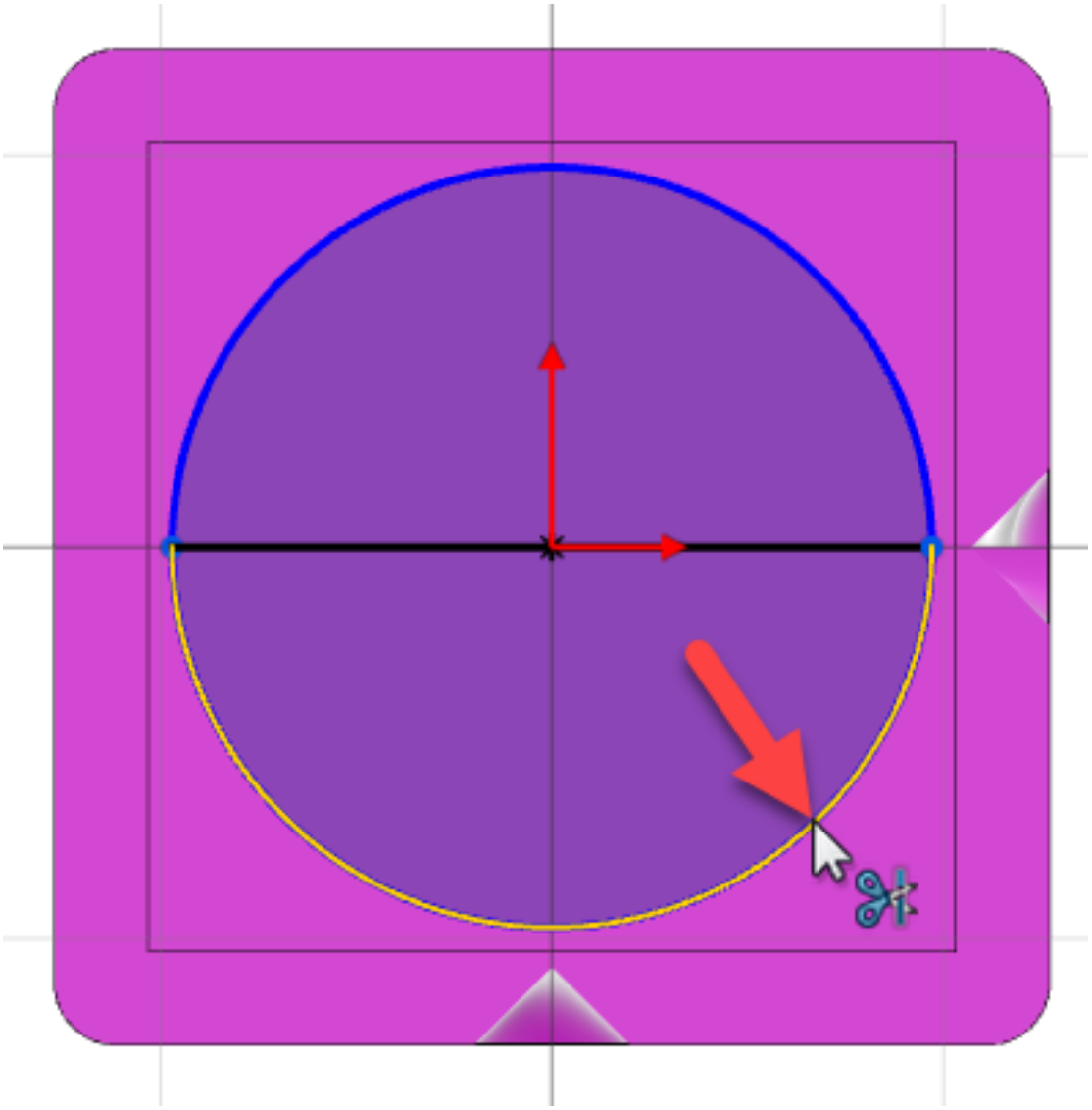


25. Press Escape (Esc) on the keyboard to exit the Line tool

26. Click the **Trim or Extend** tool on the Action Bar



27. Hover your mouse over the lower part of the circle

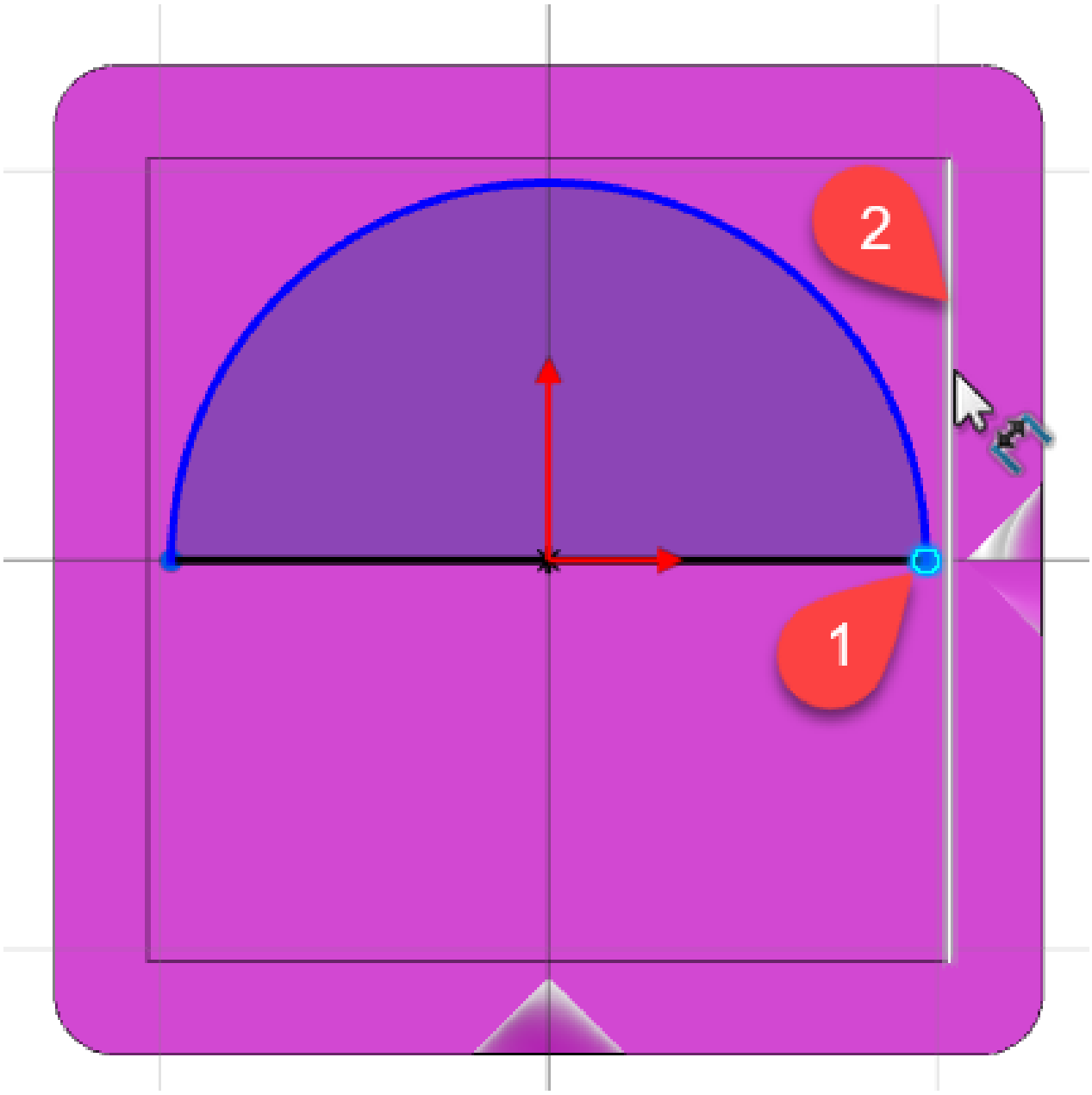


---Notice how it highlights half of the circle

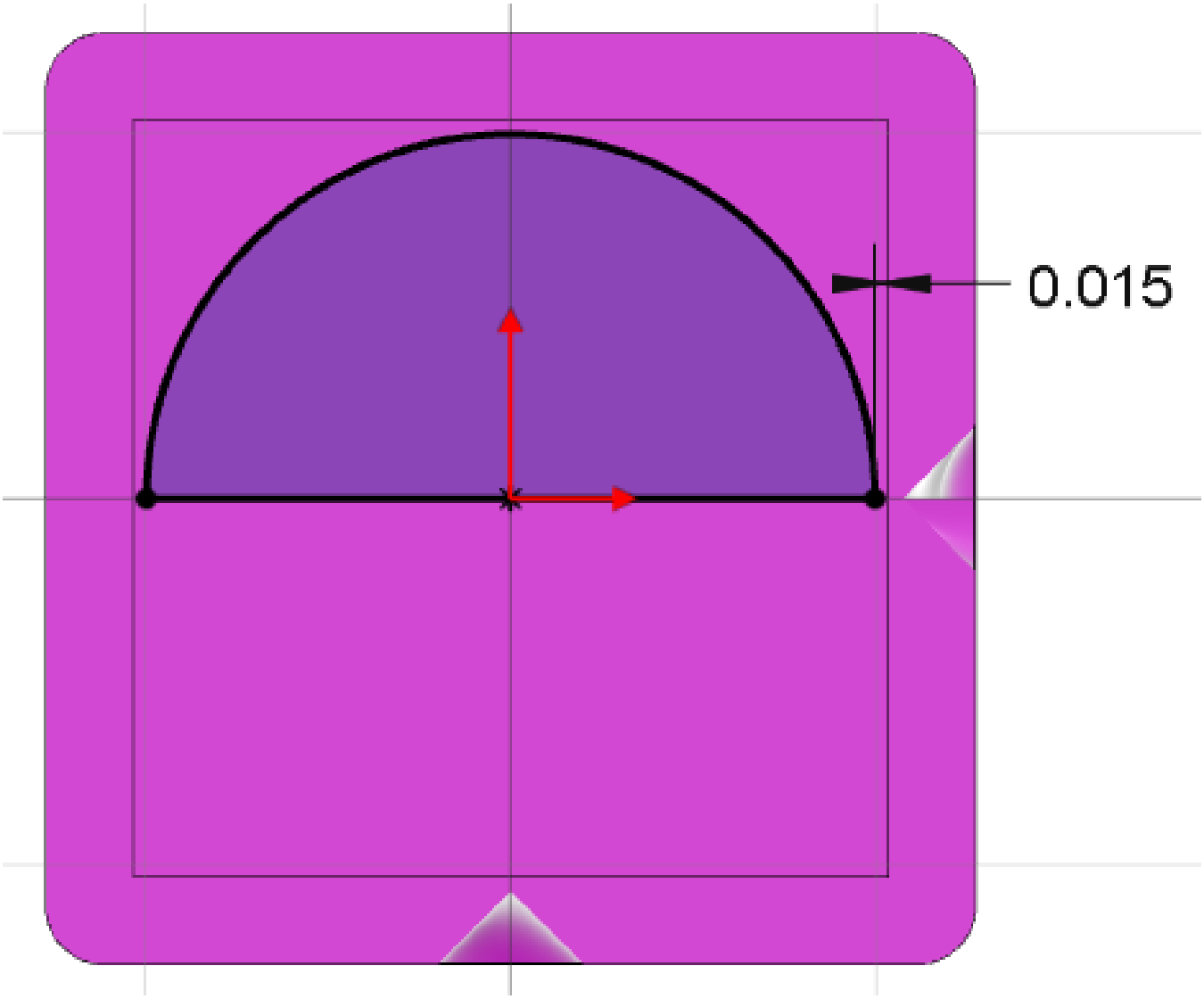
28. Click the lower half of the circle to trim it away, then press Escape to exit the tool

29. Press “D” on the keyboard (this is the shortcut for the “Dimension” tool)

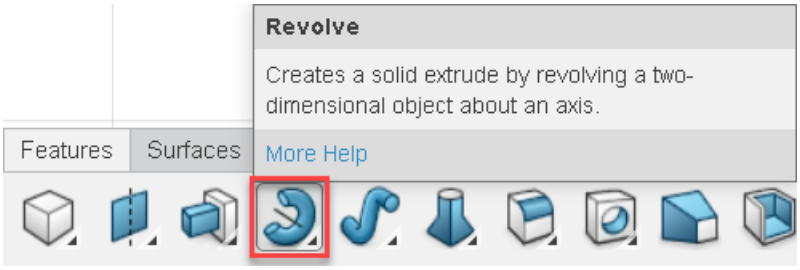
30. [1] Select the rightmost point on the semi-circle and then [2] select the closest inner edge of the die



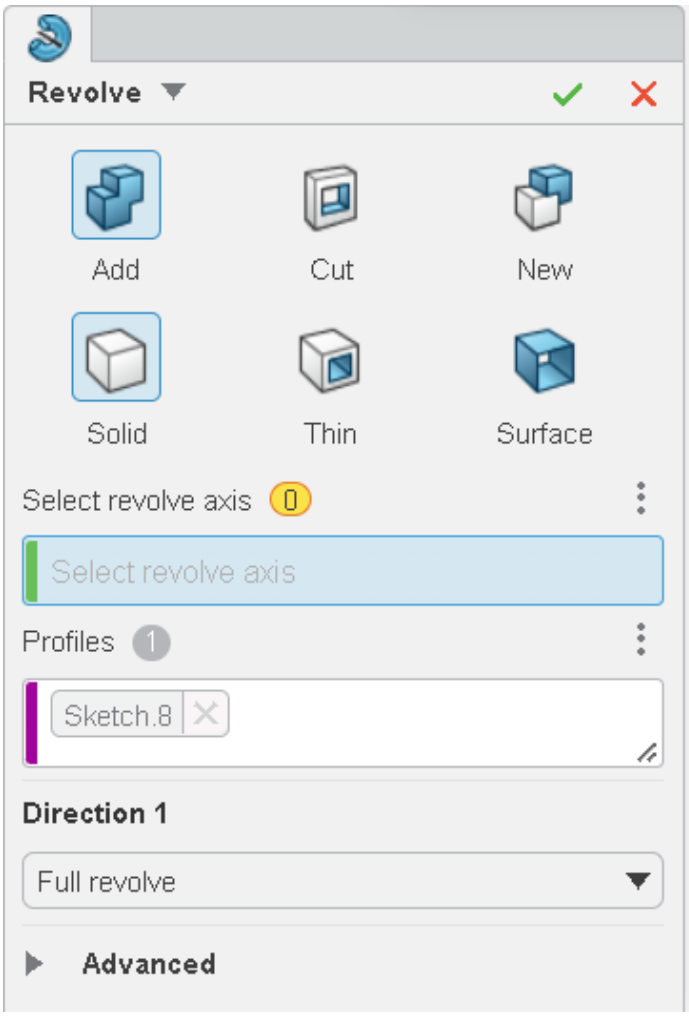
31. Place the dimension off to the side and enter a value of **0.015** in

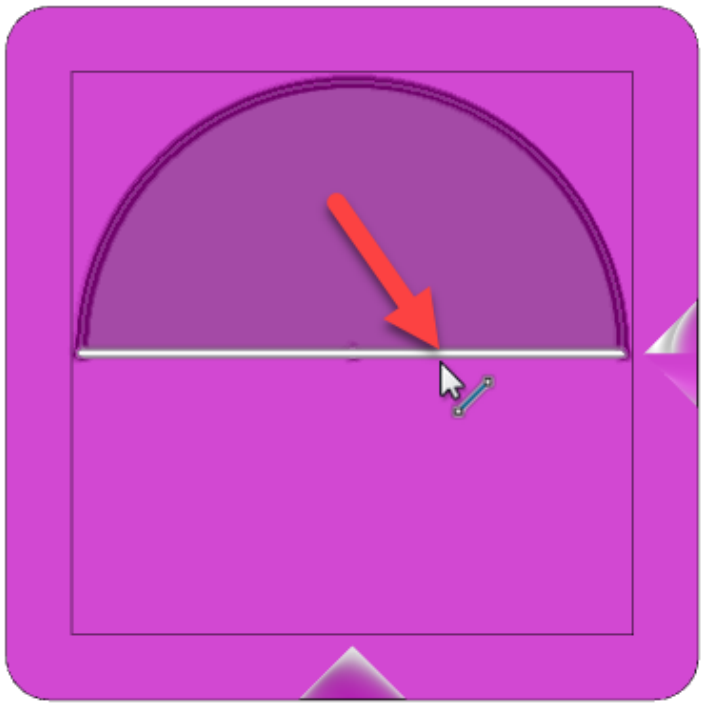


32. Click **Revolve** on the Features Tab of the Action Bar



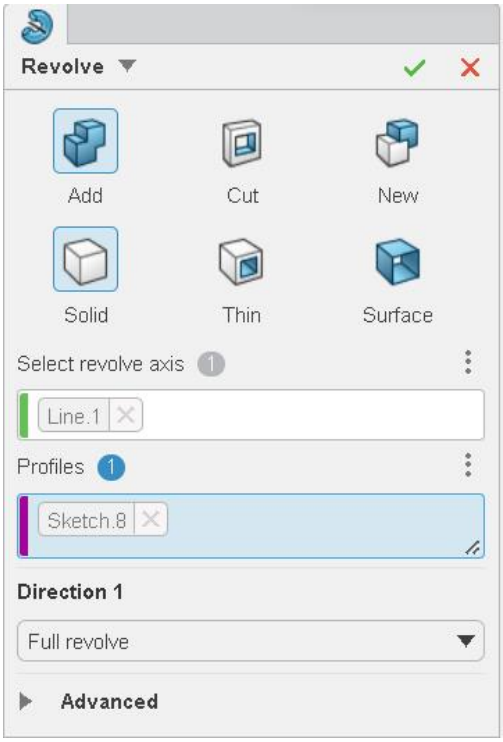
33. Select the line in your sketch as the Revolve Axis

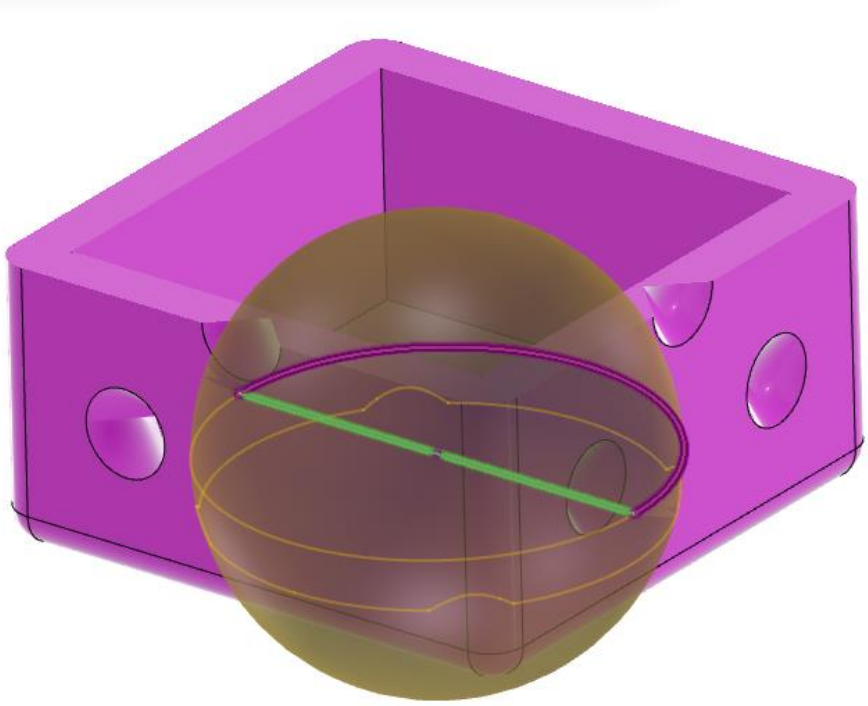




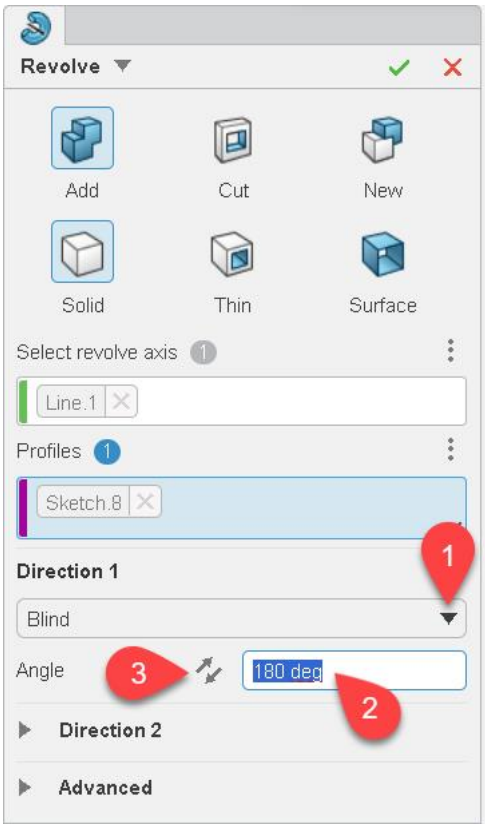
34. Rotate your mode so you can see it in 3D (hold down the middle mouse button in the graphics area and drag)

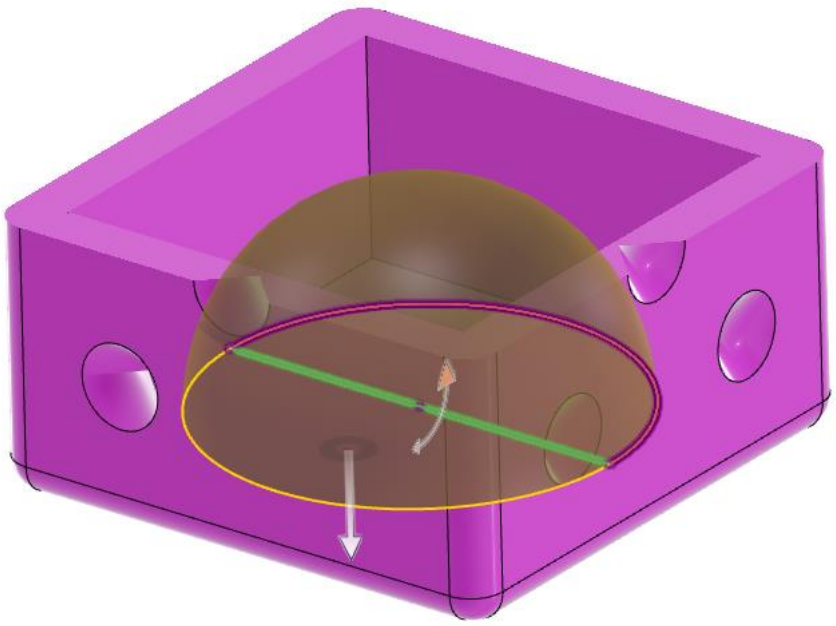
    NOTICE: you are currently revolving the semi-circle a full revolution, which is creating a sphere



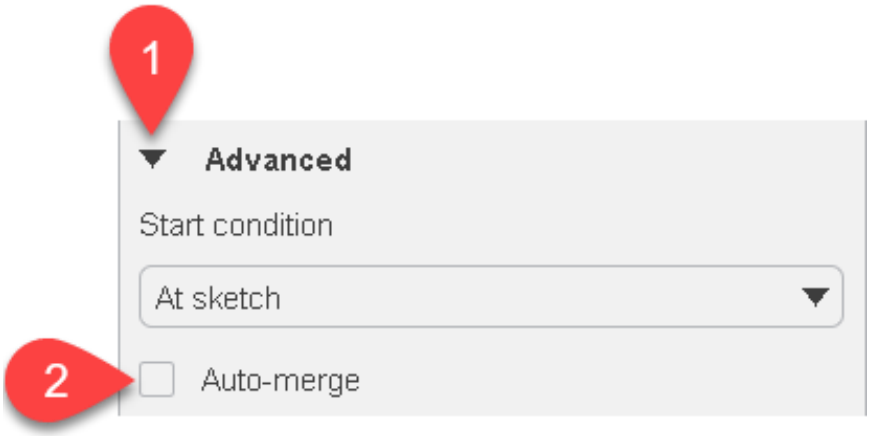


35. [1] Click the **Direction 1** dropdown and choose “Blind”, then [2] enter **180 deg** in the Angle field. If necessary, [3] click the “Flip Direction” button to achieve the results shown below



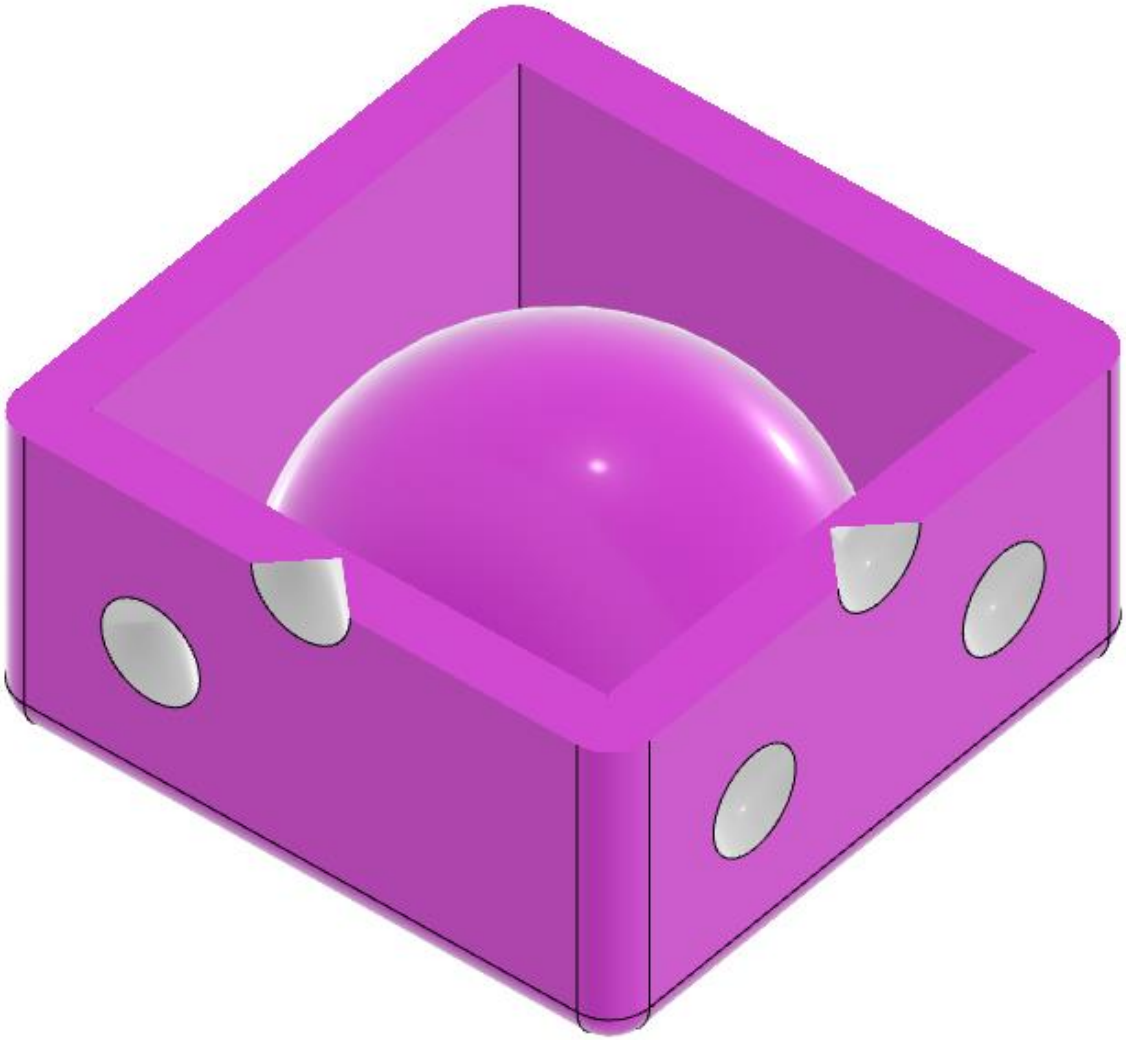


36. Expand the **Advanced** section of the dialog, and uncheck the **Auto-merge** option

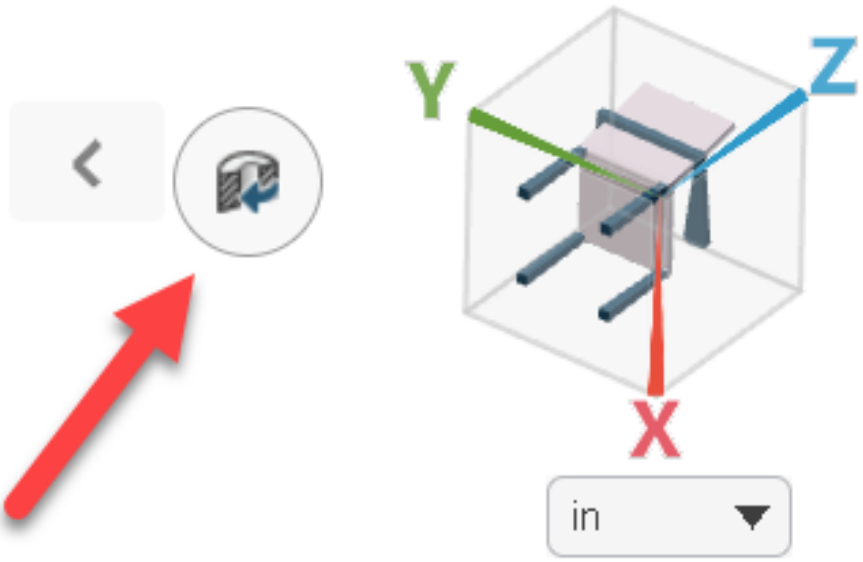


37. Click the **OK** checkmark to complete the revolve command

    ---You now have a multi-body model that you can either 3D Print as-is, or use the capabilities of your 3D Printer Slicer to print each body with a different infill. Printing the hemisphere that you just modeled with 100% infill will make it even heavier than the rest of the model printed at, say 15% infill.



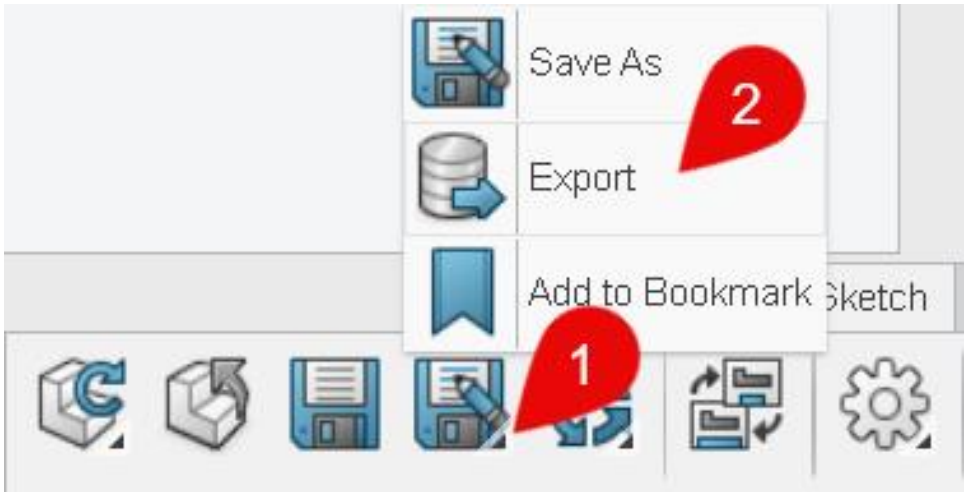
38. Click the **Exit Section View** button near the view cube to show the whole model again.



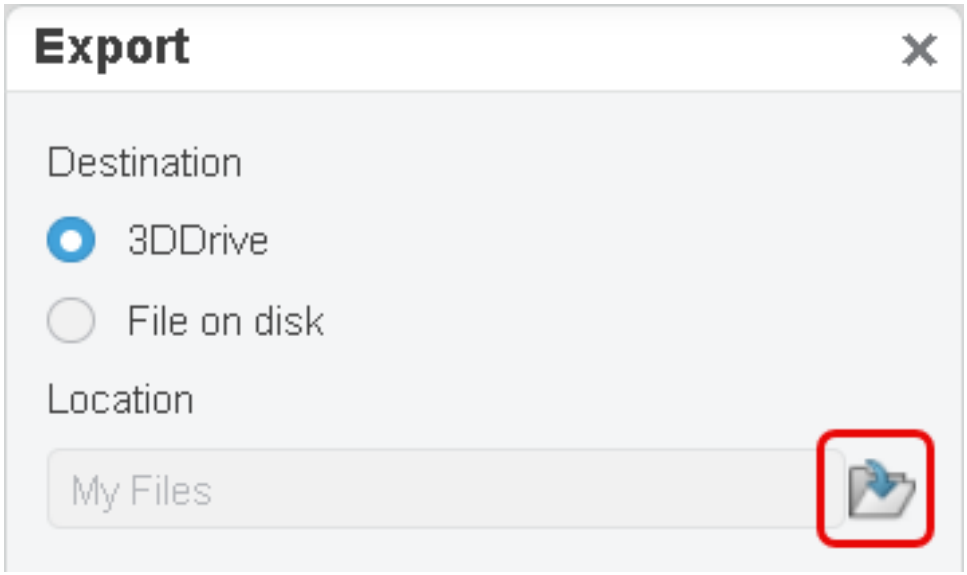
39. Click “Save” on the Action Bar to save your custom trick die

FABRICATE YOUR TRICK DIE

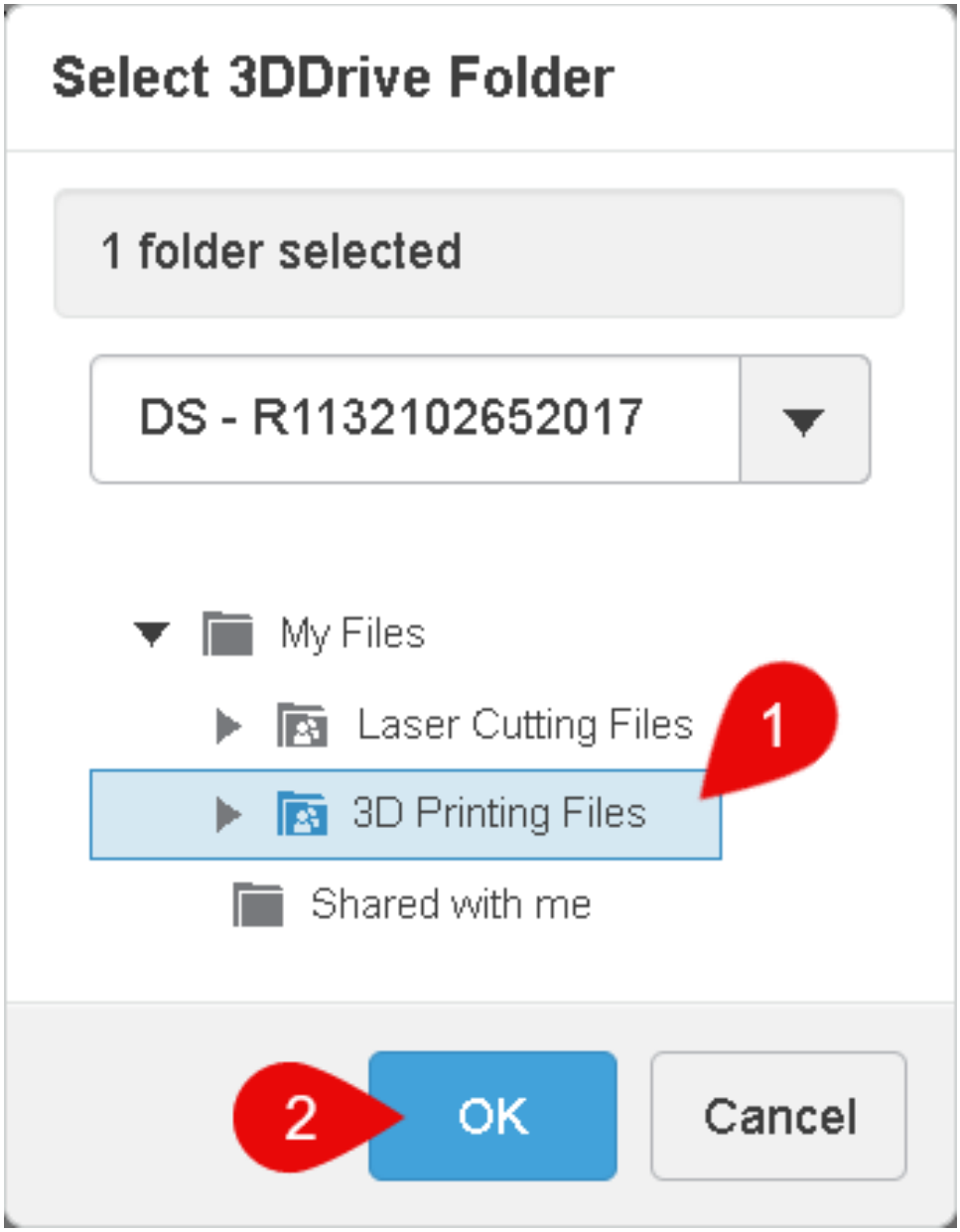
40. [1] Click the flyout corner under the Save As command on the Standard tab of the Action Bar, and then [2] click the **Export** command



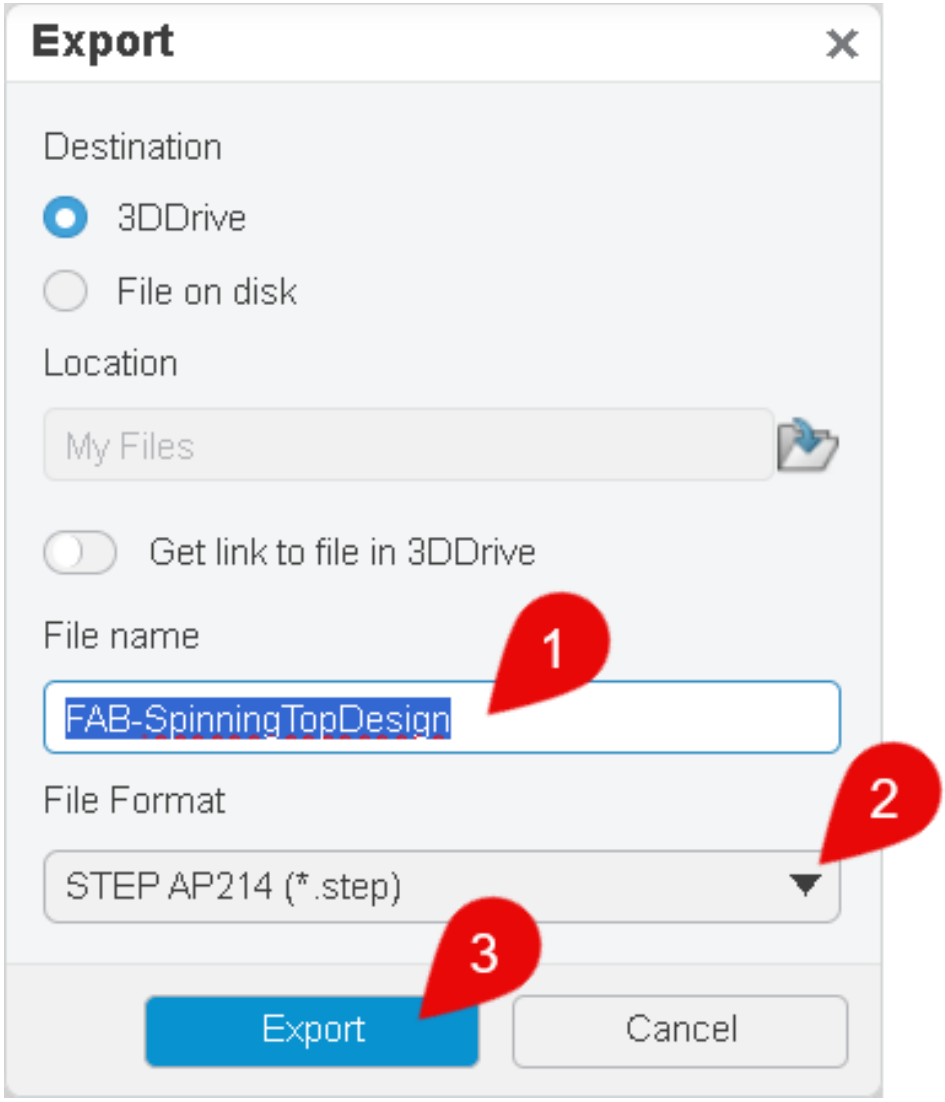
41. Click the Location folder button



42. [1] Select the folder your instructor told you to use to save your files, then [2] click **OK**



43. [1] Give the file a unique name, [2] change the format to “**STEP AP214**”, and then [3] click **Export**



Congratulations!

You’re ready to 3D print your trick die!

See your teacher for further instruction!