



## How to Make a Newton's Gravity Puzzle



by tomatoskins

The [Newton's Gravity Puzzle](#) is a very simple puzzle. The objective is to remove the center piece while keeping the puzzle on a level surface. No tools can be used to remove it, only your body and the puzzle itself.

Here are the steps to make your own puzzle along with the solution at the end.



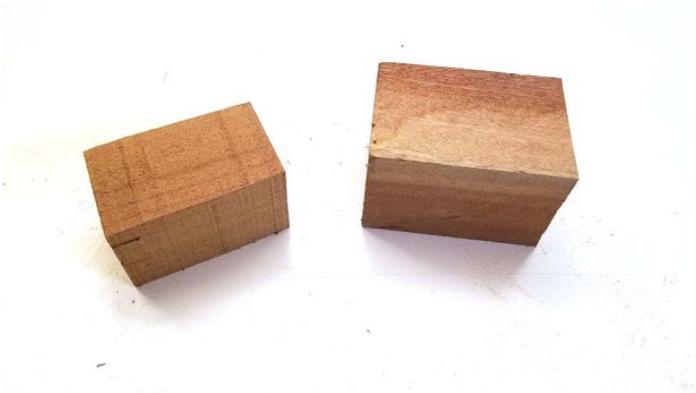
## Step 1: Tools and Materials

Materials:

- Wood
- Paint

Tools:

- Lathe
- Nova Chuck
- Sandpaper



## Step 2: Inner Piece

This inner piece of the puzzle is made from an old cedar 4x4. However, any light wood would work here. I mounted it in the nova chuck and turned a cone on the end then turned it round to a diameter of 1 in.

Remove the piece from the lathe without parting it off.





### Step 3: Turn the Outer Shell

Turn the shell between centers then mount it in the nova chuck. Hollow out the center just larger than the inner piece. You want between 1/16 and 1/8 inch of clearance all the way around. This hole should be about 1 1/4 in. deep. Once the hole is at the correct depth, turn to the final diameter of 1 3/4 in and add a chamfer to the edge if you like.

Part it off at a length of about 1 1/2 in.





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#### Step 4: Cut the Inner Piece to Length

Once the shell is parted off, you want to cut the inner piece to the correct depth. The edge of the inner piece should be just below the shoulder of the shell. It should sit low enough in the shell that the inner piece can't be grasped with fingernails.



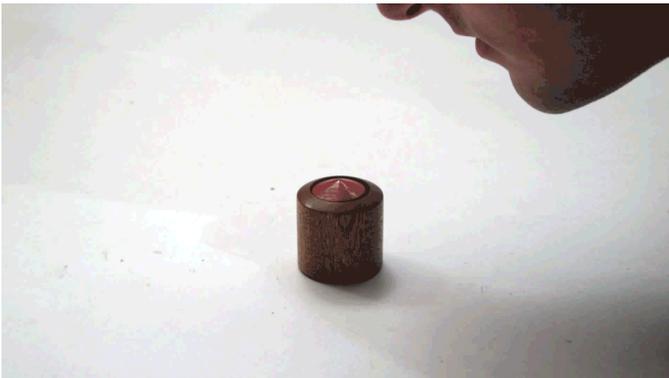
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#### Step 5: Sand and Paint

Sand and apply any color paint you like. I went with the traditional red of the original [Newton's Gravity Puzzle](#).



## Step 6: How Does It Work?



Atmospheric pressure is present around every object on earth. The Newton's Gravity Puzzle is solvable through creating a difference in pressure above and below the inner piece. To overcome the acceleration of gravity, a gentle blow directly on the puzzle will decrease the pressure above the cylinder sucking it out and solving the puzzle.



Great, Troy. I'll make some for the grandkids - and their parents for Christmas.

From one mechanical engineer to another: if you have had your fluid dynamics courses, you know Newton had little to do with this. The puzzle is best explained by Bernoulli's equations, and demonstrated by an airplane wing - the moving air over the curved top of the inner part creates a lower pressure and lifts it out of the shell.



Haha I'm actually currently finishing up my first fluid dynamics course right now (3 weeks left!). I hadn't actually thought about it in terms of Bernoulli's equations. But you are completely right!



It's a really mindblowing puzzle. When I read the whole thing i was amazed how simple it is. Awesome job mate :D



This is so cool!! Great way to teach physics to children



Sure! What part was unclear?



This is so cool. I do not have the cutting tools to make it but I know that it is amazing.



Does the type of wood matter?



If I had to guess it's just any light wood (weight wise) to make it easier for the inner peice to lift out. But I could be wrong



Cool project, tomatoskins!

You've inspired me to replicate it for 3d printing. See it at  
<https://www.thingiverse.com/thing:3167661>



That looks great! Were you able to print it yet?



Thank you, and yes, I did. I'll post a photo of it after my wife brings it back from work.

- A beautiful little trick/toy/experiment. Thank you for sharing it :-)
- This is really cool!  
Nice job, tomatoskins!



Ooooww, wonderful!

- I like it. Easy to make, if you have a lathe, and easy to solve, once you know the answer. But either way a great conversation piece. Thumbs Up!