

(30 pts) Approx. 3 days

The final part of this unit is to make a puzzle cube. This will incorporate measurement and variability as we try to make the puzzle as precisely as possible, and as we measure the difficulty of the puzzle. As you design and build your puzzle cube, be sure to take good notes!

1. Start by watching the *Puzzle Cube Overview* presentation. Take some time to look at other puzzle cubes and puzzle cube pieces. Take some notes on what you'll have to do to make your own puzzle cube, and brainstorm any ideas you have for making your puzzle cube extra special!
2. Write & Draw a plan for your puzzle cube. Your plan should be in your engineering notebook and should include a description of how many pieces you want to make your puzzle, what shape they will each be (isometric sketches would be good here), and what decorations you might want to make.
3. Build your puzzle cube! Start by measuring your individual cubes so they are as similar as possible. Your final assembled puzzle cube needs to be  $3 \pm 0.05$  inches in each direction. This requires making sure your individual cubes are as close to a cubic inch as possible!
4. Build your puzzle cube following your design.
5. Have 5 other people try and solve your puzzle. Time how long it takes them to solve it and record those times in your engineering notebook.
6. Do some statistics on your solving time measurements. Find the average and standard deviation of your puzzle cube solve times. Do you think your puzzle is hard or not? How do your statistics help tell you?
7. **Achievement:** Decorate your puzzle cube pieces by painting or laser engraving them. Make a small custom storage box for your puzzle cube following the instructions from Mr. Benshoof

Part 3: Tasks	5 points	4-3 points	2-1-0 points
 Puzzle Cube Notes	+ Take a full page of notes on the <i>Puzzle Cube Overview</i> video AND on the existing puzzle cubes.	- Less than a full page of notes and ideas	- Less than a full page of notes and ideas
 Puzzle Cube Plan	+ Make a written plan for your puzzle cube. + You should include sketches of what your puzzle pieces will look like.	- Your plan does not include pictures - Your plan does not include the number and sizes of each piece	- Your plan is missing
	<b>10 points</b>	<b>9-4 points</b>	<b>3-0 points</b>
 Puzzle Cube Build	+ You built your puzzle cube to meet the designated parameters. + Your puzzle cube pieces are carefully made and sturdy	- Your puzzle cube pieces do not fit together well	- Your puzzle cube pieces are incomplete or poorly assembled
 Puzzle Cube Solving Data	+ You have 5 people solve your puzzle cube. + Their solve times are recorded in your notebook + You calculated statistics on your data and recorded them	- You had fewer than 5 people solve your puzzle - You did not calculate the needed statistics	- You had fewer than 3 people solve your cube - No other notes, times, or statistics are recorded.
 Achievement	+ You decorated your puzzle cube pieces and made a small carrying box for the assembled puzzle.		

