IME 100: Interdisciplinary Design and Manufacturing
Toy Manufacturing Project

Your Mission: To design and manufacture Toy(s) for pre-kindergarten students (25 points)

In groups of **4**, you will design and manufacture learning toys for pre-kindergarten students. You may choose from the examples given on pages 2 & 3, or design your own.

To begin, you must join a group on Blackboard where you will maintain and submit documents.

Use Fusion 360 to design your toy. You may manufacture it using the LagunaIQ and/or 3D print parts. Other manufacturing options may also be available on request.

Stock material for LagunaIQ is x = 11.25 inches, y <= 16 inches, z = 0.5 inches, 0.75 inches, or 1.5 inches. Other stock sizes may be available with justification.

3D print filaments available are PLA and ABS (PLA is recommended).

Once you have your design completed and approved, you will need to step through your Fusion 360 model to verify datum (Origin), stock size, and estimated machining time (≤ 20 minutes) from your setup sheet. Once approved by the technicians, you will need to (for Laguna) post-process and save your files on a blank USB stick. You can then proceed with your **Setup Sheet** to the manufacturing lab or (for 3D Printing) proceed to the 3D printing farm where you will have to take additional steps.

Toys should be **large enough** — at least 1¼ inches (3 centimeters) in diameter and 2¼ inches (6 centimeters) in length — so that they can't be swallowed or lodged in the windpipe. A small-part tester, or choke tube, can determine if a toy is too small. This choke tube is available in AB1209.

Deliverables:

1. A photo of your completed toy [2.5]
2. Setup Sheet (PDF) and/or 3D print slice data (GCode) [2.5]
3. Dimensioned Engineering Drawing [5]
4. How to play manual for the toy [5]
    a. Include figures
5. Group Reflection [5]
6. Link to Website portfolio with all of the above files [5]

Once manufactured, the items above will be turned in as a package on Blackboard.
Your reflection (~ 1 - 2 pages) should discuss

What went well during the design/machining process
What did not go well during the design/machining process.
Your groups learning from this project
Your group performance in design and manufacturing the toys
For example, did the proposed and actual cycle times match? Did the toy resemble your model? If not, why not. How did the drop test go?

Overall project grades will be based on your reflection, the quality of your toy, website ease of navigation, and the thoroughness with which you completed the design and manufacturing (reflected on your Setup sheet/Gcode).

The deliverables are due on Blackboard during Week 8

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Here are some examples of intermediate toys (or you can design your own):

Family	Example	Notes:
Nested Toy	 	• Shape may vary. • Limit to 5-7 pieces. • Natural wood or primary colors.
Shape Board		• Shapes may vary. • Limit to ≤ 3 pieces/shape. • Natural wood or primary colors. • Can be multiple combinations.
Gears		• Gear sizes vary. • Limit to 5-7 pieces. • Natural wood or primary colors.

Pieces must be large enough to avoid choking hazards and small enough to avoid projectile hazards!!
3D printed parts need to be strong enough for handling by toddlers

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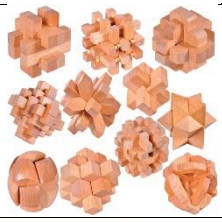
Here are some examples of advanced toys (or you can design your own):

Family	Example	Notes:
Shape Board		• Shapes may vary. • Limit to one-piece shapes. • Natural wood or primary colors. • Shapes should only fit in one spot!!
3D Puzzles	 	• Shapes may vary. • Limit to 5-7 pieces. • Natural wood or primary colors. • Can be multiple combinations.
Gears		• Gear sizes vary. • Limit to 5-7 pieces. • Natural wood or primary colors.

Pieces must be large enough to avoid choking hazards and small enough to avoid projectile hazards!!
3D printed parts need to be strong enough for handling by toddlers