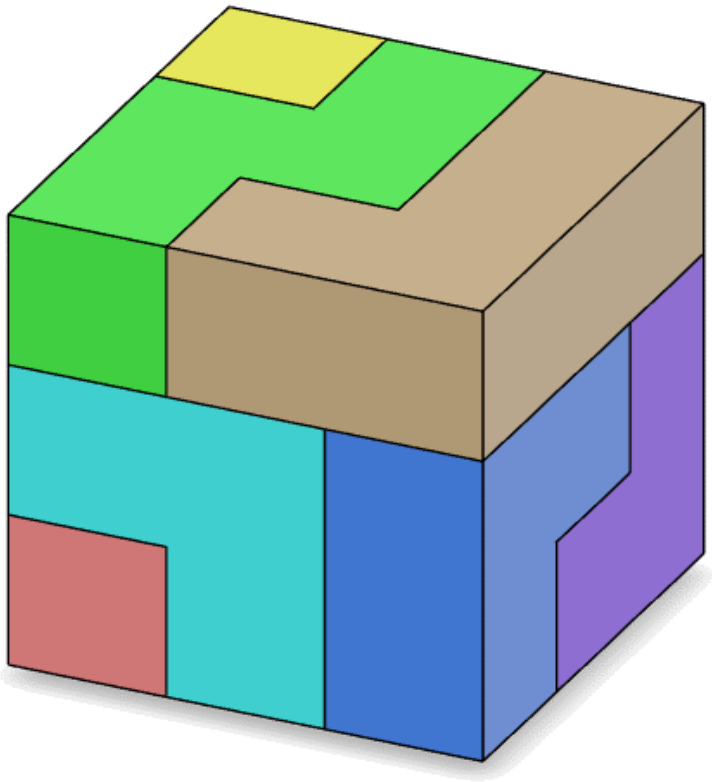
SOLIDWORKS

DESIGN PROJECTS

STUDENT GUIDE

3DEXPERIENCE



PUZZLE CUBE

DASSAULT SYSTEMES

DESCRIPTION

Welcome to the Design Projects Student Guide! The focus of this project is a Puzzle Cube, a 3D-printed, interlocking puzzle that challenges you to think critically about design, assembly, and problem-solving.

This guide contains information regarding Design Intent, DFAM (Design for Additive Manufacturing), and Design Tips to keep in mind for each part.

For a video demonstration of the design approach, detailed dimensions, and step-by-step instructions, see the links in the **Additional Resources** section below.

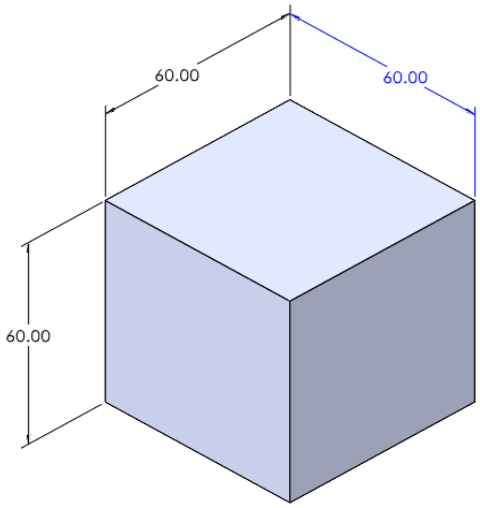
PROJECT TASKS

1. Create the overall block in CAD.
2. Split the overall block into 27 small blocks.
3. Combine those small blocks into at least 5 interlocking pieces.
4. Re-assemble the pieces in CAD.
5. 3D Print or manufacture the pieces.
6. Assemble the physical pieces and challenge others to do the same.

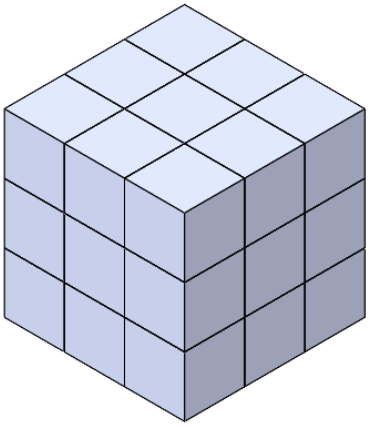
ADDITIONAL RESOURCES

- LINK TO DOCUMENTS
- LINK TO YOUTUBE VIDEO
- LINK TO STEP-BY-STEP

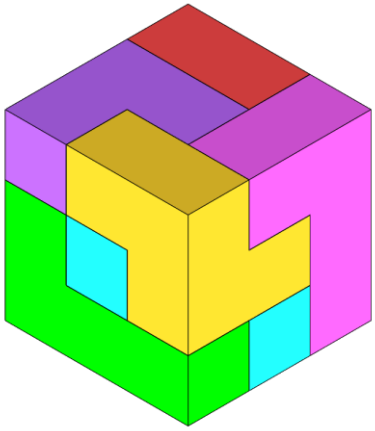
PUZZLE CUBE COMPONENTS



"Master Model" Cube



"Split" Cube



Cube Assembly

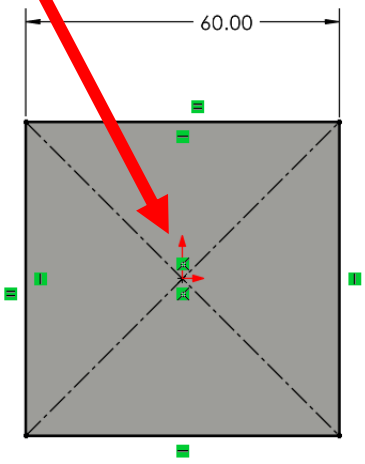
MASTER MODEL CUBE

DESIGN INTENT

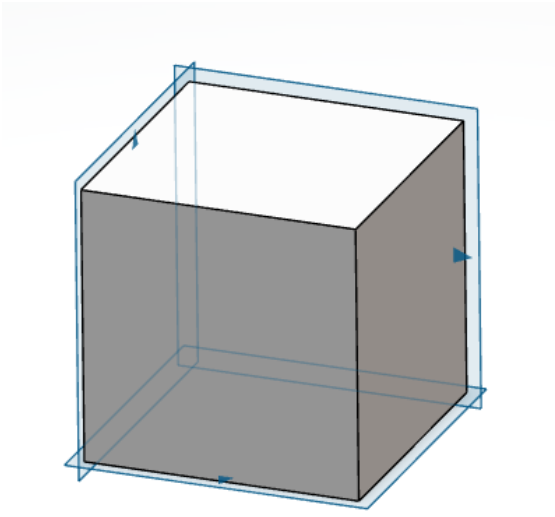
- 60mm x 60mm x 60mm cube.
- This represents the finished volume of the puzzle cube.
- Sketched and extruded in a way that makes it suitable to be split by reference planes.

DESIGN TIPS:

- Sketch a 60mm x 60mm square centered at the Origin.



- Extrude 60mm in one direction to allow you to offset planes in even increments.



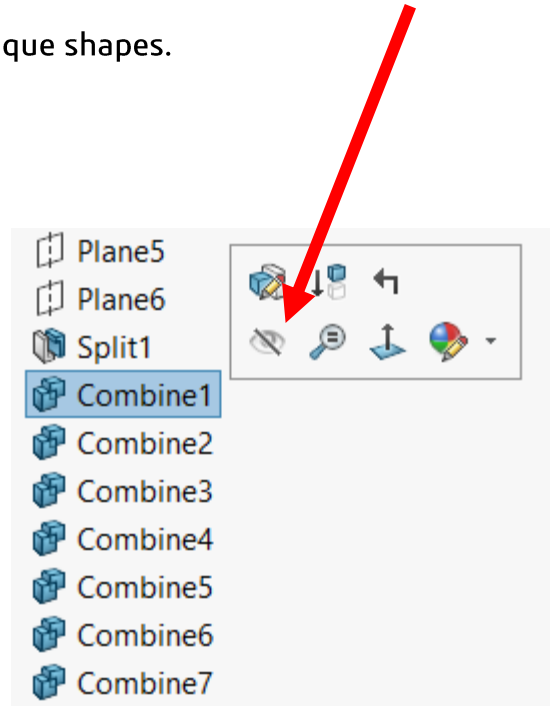
SPLIT CUBE

DESIGN INTENT

- Create offset reference planes 20mm apart.
- Split cube into 27 smaller cubes.
- Join the smaller cubes into puzzle pieces.

DESIGN TIPS:

- Click on a reference plane and choose Plane tool to create a 20mm offset plane.
- Select the previously created Combine feature and click Hide to view the cubes behind it.
- Try to create unique shapes.



CUBE ASSEMBLY

DESIGN INTENT

- Create individual parts from the joined bodies
- Create an assembly of those parts.

DESIGN TIPS:

- Use the Create Assembly from Sets tool to create the assembly.
    - Be sure to UNCHECK Design Features – this is the entire cube, you don't want that in the assembly.

3D PRINTING

- Export each part as an STL file.
- Nest your parts to print many at one time.
- Orient the parts to minimize the use of support material (see images below).

