1) Desired Needs of FCMRI Phantom for fetal motion acquisition in final design objectives
    - MRI compatible (1.5T), simple physical construction enough to replicate at low cost, while remaining functional without the structure hindrance to create artifacts
    - Mimic fetal anatomy using DICOM to segment fetal dimensions and anatomical outlines for basic CAD modeling
    - Mimic fetal tissue behavior (T1 values) in biomaterials (PVA gel, PLA, TPU, Gelatin, Saline solution)
    - Reproduce physiologically relevant motion (0-10 mm translation, 0-15° rotation)
2) Major constraints on design
    - Safety/Regulatory: Only non-ferromagnetic materials safe scanner
    - Mechanical: Repeatable motion within MRI bore size
    - Quality Control/Manufacture: Lightweight design simplified fabrication/assembly
3) Major Engineering Standard on Design
    - IEC 60601-2-33: safe electrical operation near MRI scanner
    - ISO 13485: design controls, verification, validation documentation
    - ASTM biomaterials standards: guide MRI-safe material selection/testing
    - ASTM F2119: measures MRI artifacts from phantom materials
    - ISO 14971: guides risk management across design lifecycle
4) Ethical, environmental, societal concerns for practical applications of project
    - Ethical: MRI-safe, accurately labeled, clinically reliable device use
    - Environmental: Material, sterilization, and packaging choices affect waste
    - Societal: better phantom Pre-MRI/MRI validation to support safer fetal diagnosis
5) Active Teamwork & Leadership
    - Shared ideas and weighed options across choosing designs, material selections, motion implementation, and MRI testing and workflow
    - Delegated leadership and subprojects through design, materials, motion, and acquisition subprojects
    - Set shared goals and deadlines for repeatable motion, MRI compatibility, and 1.5T validation
    - Used mentor guidance and constructive feedback to refine testing plans
6) Motivating Factors
    - Observing MRI sessions clarified imaging workflow/constraints
    - Learning from mentors and MRI experts deepened technical understanding
    - Shared project goals motivated me to take initiative
    - Limited MRI access taught me to adapt and persist
    - Setbacks strengthened my commitment to project progress
7) It was innovative and practical to extract fetal dimensions and outline a negative mold to cast PVA gel womb-like pear shape, further advantaging tissue mimicking for easily acquired T1 values. Selecting materials based on estimated T1 values so the phantom could appear meaningfully in MRI reconstruction. Due to restricted 3D-printer size, limiting full-scale fabrication, we used a fetal outline to achieve realistic geometry efficiently. We also keep our motion actuation system simple to replicate as well, using a hydraulic motion system, which is also MRI-safe with no electronic components inside the MRI environment.