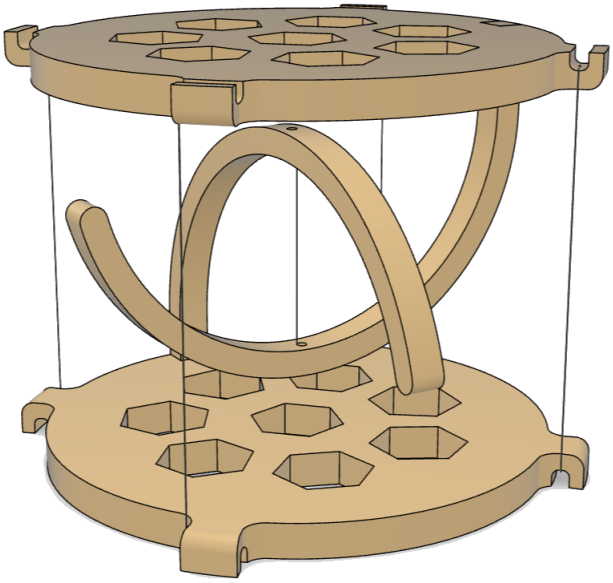
DESIGN PROJECTS



TENSEGRITY TABLE

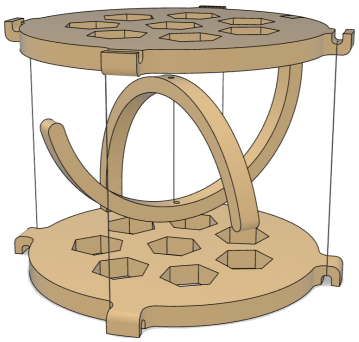
GRADE LEVEL

Grades 9-12

MODELING TIME

4 hours

MATERIALS



- Access to a 3D printer
- Filament – Approximately 140g
- Fishing line, or other suitable alternative
- Tape
- CAD Software (SOLIDWORKS or xDesign)

DESIGN OBJECTIVES

- Design, model, and assemble a tensegrity table capable of supporting a small object.
- Learn physics concepts, such as tension, gravity, and mechanical design principles, including tolerance and CAD modeling techniques.
- Understand how the balance of tension and compression contributes to creating a stable structure.

EDUCATIONAL CONCEPTS

Physics: Discuss the concepts of tension and compression, gravity, and how tension counteracts gravity in a tensegrity structure.

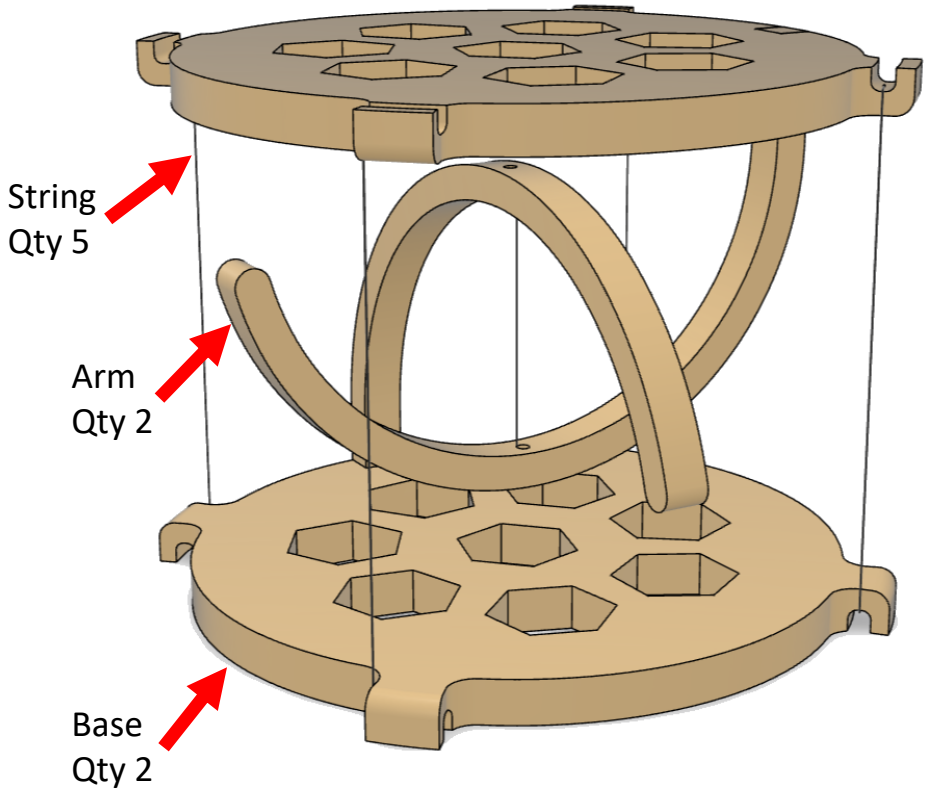
Mechanical Design: Introduce tolerance in mechanical design and how precise measurements are essential for a press-fit design.

CAD: Provide an overview of CAD modeling, emphasizing sketch features, solid features, and the modification of parts based on assembly position.

DESCRIPTION

Tensegrity structures can be found in both natural and human-made objects, including bridges, stadium roofs, tents, and even the human body. The concept of tensegrity relies on a balance between structural components to ensure integrity.

TENSEGRITY TABLE COMPONENTS



DISCUSSION STARTERS

- Why did some tables collapse while others remained stable?
- How do minor adjustments in string tension affect stability?
- What are the underlying physics of the structure?
- What improvements could be made to support more weight or enhance stability?
- What is the minimum number of strings required to maintain balance, and why?
- What other examples of Tensegrity can you identify?

ASSESSMENT CRITERIA

- Did the table remain balanced when fully assembled?
- Did the table maintain balance when an object was placed on it?

ADDITIONAL RESOURCES

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

TENSEGRITY TABLE IDEAS

