

Tower building Activity

Introduction: Through your research, you have learned that a triangle is the strongest geometric shape. You have also learned that a truss is two or more triangles connected together in a straight line. For this engineering activity, you will need to design and build a vertical truss that fits all of the design criteria and supports the most weight.

Materials

- One piece of balsa wood 1/8" x 1/8" x 36"
- 60 tooth picks
- Limited amounts of glue....excessive use of glue will be disqualified and result in a poor grade.

Design

The groups must design a full scale drawing on a piece of graph paper. The drawing must:

- Be in pencil
- Use a straight edge
- Show the thickness of the materials (Note A on the next page)
- Show a center line: the base of the tower must be at least 1" from either side of center (Note B on the next page). And the top of the tower must be at least 1/2" from either side of center. (Note C on the next page)
- HINT: A symmetrical design will work best and be the strongest
- NOTE: A toothpick is 2 5/8" long

Tower constraints

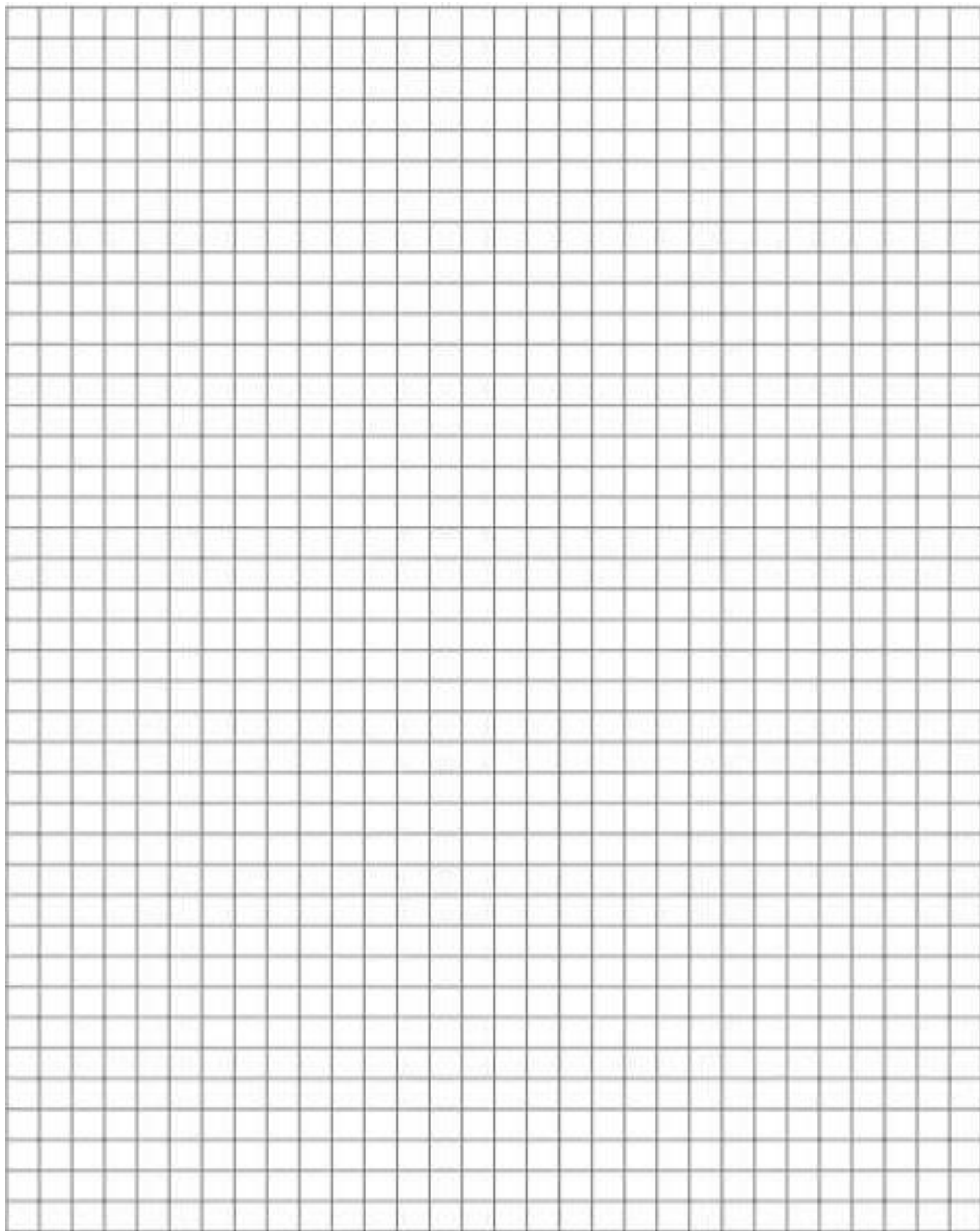
- The tower must be between 6" and 8" tall
- The tower must have three or four sides.
- The tower must be able to span a 2" diameter hole at the base
- The tower must have a 1" hole at the top

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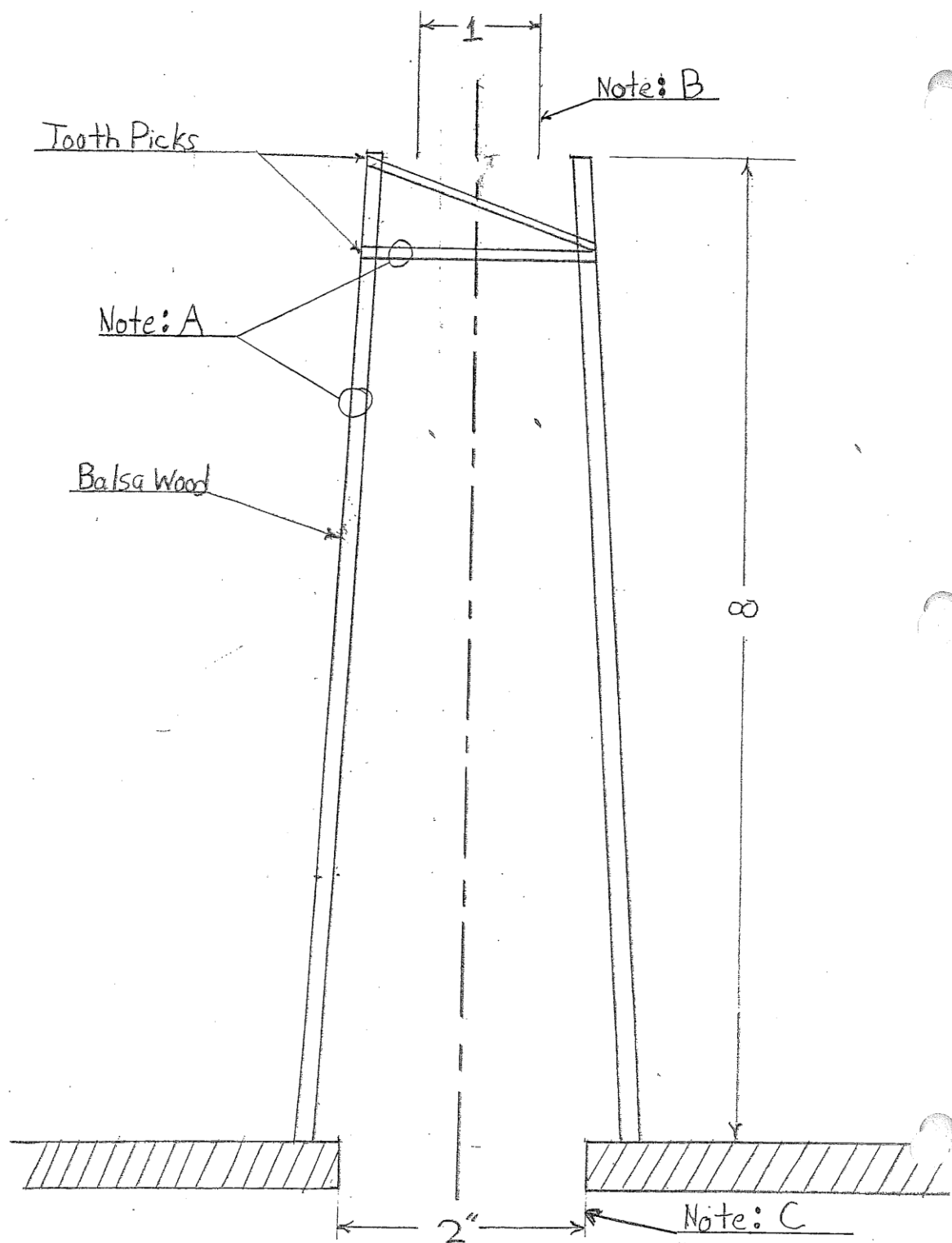
Research possible designs for your structure and make four possible prototypes. Write a brief statement as to why this structure will be a successful design. Choose one of the prototypes and develop a scale model on the back of this paper to scale using a ruler. The quality of the drawing is extremely important for this project.

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Basic Web Configurations

MiTék 20/20 Truss Shapes



Kingpost



Simple Fink



Queen



Fink



Howe



Fan



Modified Queen



Double Fink



Double Howe

Truss Types



Common



Gable



Dual Ridge



Scissor



Hip Scissor



Mono Scissor



Mono



Dropped Mono
Gable



Dual Ridge
Mono



Cathedral



Hip Cathedral



Mono Cathedral



Symmetrical
Cathedral



Non-Symmetrical
Cathedral



Cambered



Cambered Hip



Cathedral tray



Dual Pitch



California Hip



Cal Hip Cathedral



Cal Hip Tray



Cal Mono Hip



Cal Hip Scissor



Cal Hip Studio
Vault



Cal Hip Cambered



Tail Bearing
Cathedral



Tail Bearing



Polynesian



Polynesian Hip



Porch



Stepdown Hip



Mono Stepdown
Hip



Setdown Hip



Studio Vault



Attic



Attic Hip



Gambrel



Gambrel Attic



Flat



Sloping Flat



Parallel Chord
Scissor



Parallel Chord
Mono



Parapet



Sloping Parapet



Mac's Parapet



Tray



Hip Tray



Common Coffe



Hip Coffe



Scissor with
Offset Brg



Cathedral with
Offset Brg



Cape



Common with
Offset Brg



Hip with
Offset Brg



Bow



Barrel



Bow Barrel



Common Cap



Hip Cap



Mono Cap



Mono Hip Cap



Inverted