



## Empowerment Activity – Toothpick Bridge

Topic/Theme: Civil Engineering Careers

Video: Civil Engineer: What I Do - Charmin Roundtree

<https://www.careergirls.org/career/civil-engineer/>

Supplies:

- Toothpicks
- Glue
- Grid papers

Invite students to share what they know about civil engineering. Let them know they will be watching a video of a civil engineer talking about her work.

After watching the video [Civil Engineer: What I Do - Charmin Roundtree](#), ask your students the following questions:

- Examples of civil engineering projects include roads, buildings, airports, tunnels, dams, bridges, and systems for water supply and sewage treatment. Which one of these are you most interested in and why?
- Having a strong foundation in math is essential to a career in civil engineering. Why do you think that is important?

Activity Instructions:

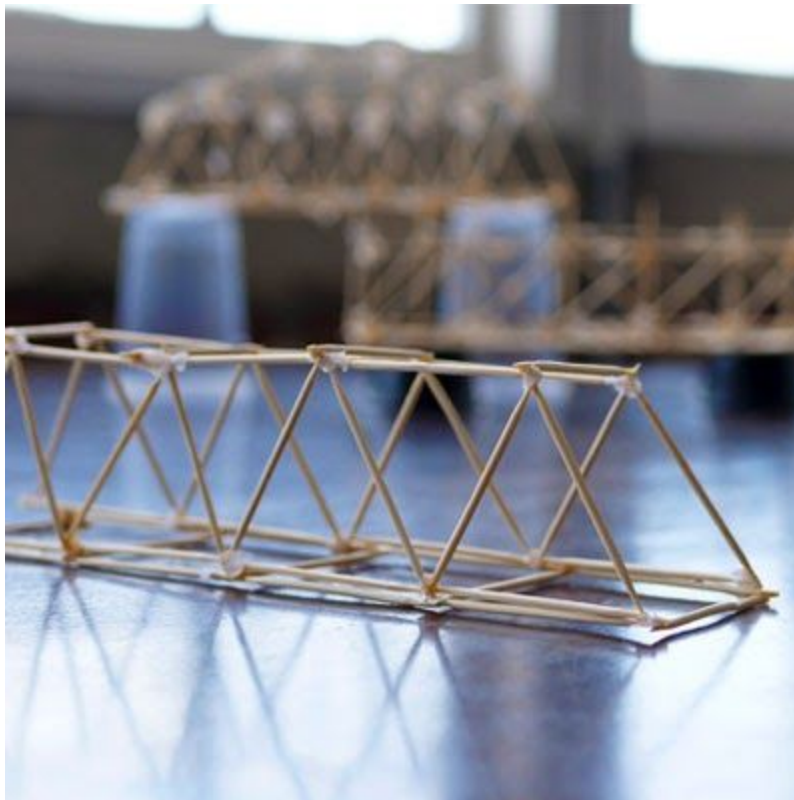
The objective of this project is to build a bridge using nothing but school glue and toothpicks. Students can work individually or as a group.

1. Figure out what bridge design you want to build (refer to the image below).
  - a. Sketch the deck of your bridge on the grid paper. Using grid paper will ensure that your bridge is even and you know the size before building it.
  - b. Sketch the barriers of your bridge on the grid paper. You only need to sketch one, but you'll need to build two identical barriers. The length of your barriers should equal the length of your deck.
2. Place wax paper over the grid paper. Build your deck and barriers on the wax paper using your sketch below as your reference. Tip: Glue the toothpicks together on top of your sketch.

3. Once the glue is dry, carefully peel off the barriers and place them on each side of the deck to make sure it will fit. Glue on one side at a time. Use books or something heavy to keep the barriers standing up until the glue dries.
4. Optional: Design the piers or pillars for your bridge. Once all the glue is dry, place the bridge on top of the pillars. Tip: Lay the pillars and bridge on its side, glue one side and wait until it's dry. Then, do the next side.

## Optional Career Girls Website Activity:

Share information from the [Civil Engineer](#) career page with your students. Point out role models on the page so they can see examples of different types of careers within or related to civil engineering. If students have access to computers, encourage them to select one or more of the role models to learn more about each of their careers.



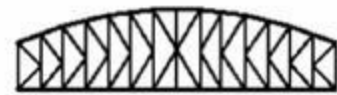
Example Bridge Designs:



**Pratt**



**Parker**



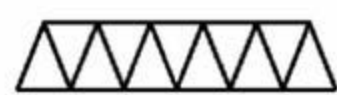
**K-Truss**



**Howe**



**Camelback**



**Warren**



**Fink**



**Double Intersection Pratt**



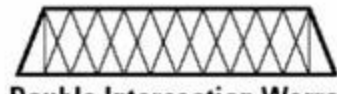
**Warren (with Verticals)**



**Bowstring**



**Baltimore**



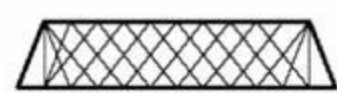
**Double Intersection Warren**



**Waddell "A" Truss**



**Pennsylvania**



**Lattice**