Spring 4-16-2023

Bridge Building

Admin STEM for Success
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Bridge Building

Name of activity: Bridge Building

Age/Grade range:

STEM discipline(s):

- Engineering

What topic does this activity relate to?

- Design

Pre-activity / Pre-work (what students should know or prepare before doing engaging in this activity; what teachers need to prepare before leading the activity)**:**

What should the students learn by the end of this activity?

- Learn and understand different types of bridges, as well as the best situations for each
- Understand the design process when it comes to building
- Problem solving through the design process

Tools/supplies needed (indicate quantity and if it needs to be bought + price range):

- Suggestive materials
    - journal/notebook for each group in order to keep all their designs together
    - Wax/parchment paper
    - Graph paper
    - Wooden sticks (quantity depends on the size and design of the models)
    - Hot glue cut down the wooden sticks
    - One protractor per group
    - A small cutter

Total price (indicate per class or per student):

Step-by-step instructions on how to conduct the activity (attach link if found online and make note of modifications for your class here): (Include e.g., size of groups, images of materials or people doing the activity that might help the reader lead the activity, helpful supporting materials)

1. Provide students with information regarding different types of bridges and their basic structures

2. Allow the students to sketch their bridges in a journal or notebook based on their decision of which bridge model they would like to make
3. Teach the students how to use a protractor (using it for accurate angle measurements and straight lines) in order to make their final design
4. Create the final design to scale for the size of the bridge model, preferably on graph paper in order to keep it precise
    a. NOTE: the design must have each side, top and bottom drawn to scale
5. Place wax/parchment paper on top of the design and begin to fit the wooden sticks to the size of each component of the design
6. Place a foam board underneath the design paper and begin to pin the wooden sticks to the design
7. Begin gluing the pieces together
    a. NOTE: be sure not to use too much glue, as it could weaken the unions and take too long to dry
8. Once the bridges are completed, have the students create a presentation about the obstacles they encountered, as well as what they learned throughout the project

During activity:

Number of students present:

What modifications had to be made to the lesson plans and why (if any)?

- For younger students, the teacher may need to do all the cutting for them

Provide feedback: teacher observations, specific student feedback, work products:

Post-activity (reflection):

What aspects of the activity worked well?

What can be improved on?

What suggestions do you have to adjust the lesson for different purposes or populations?

- Younger children are not best for this, as they would need the teacher to cut, glue, and pin everything
- Ages 12 and up are best
- If younger children would like to work on the project, the groups should be bigger and there should be one teacher/mentor assisting each group in order to guide them better through the process

If money was spent on tools/supplies, in your opinion, was the investment worth it?

Provide thoughts on alternative materials, steps or other modifications that might be worthwhile for others to consider.

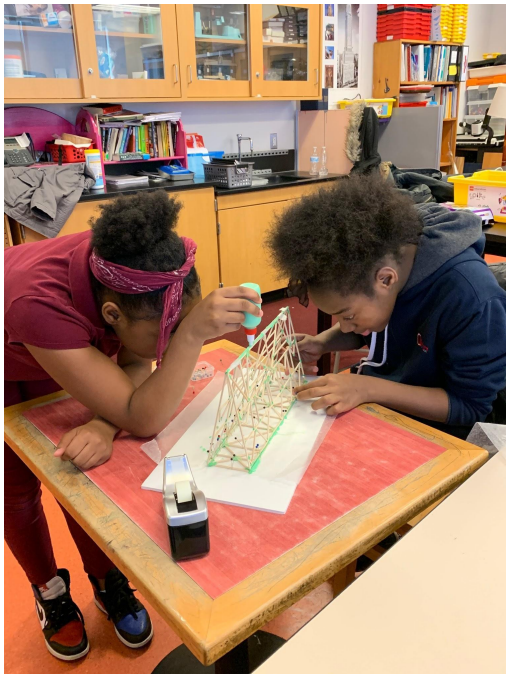
Additional notes:

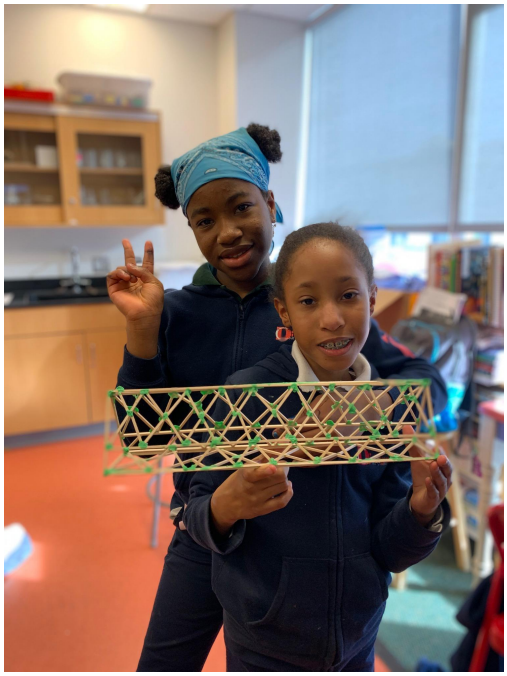
- The project took way longer than expected
- After a few weeks, the girls began to lose interest (ages 10-12)
- The girls need to be closely monitored because of the possibility of them cutting themselves
- Perhaps integrate a lesson on different types of bridges
- Best to keep the groups to 2 students per bridge
- Very hands on, the girls had a lot of fun with their freedom to design their own structures
- Be very cautious in storing the bridges

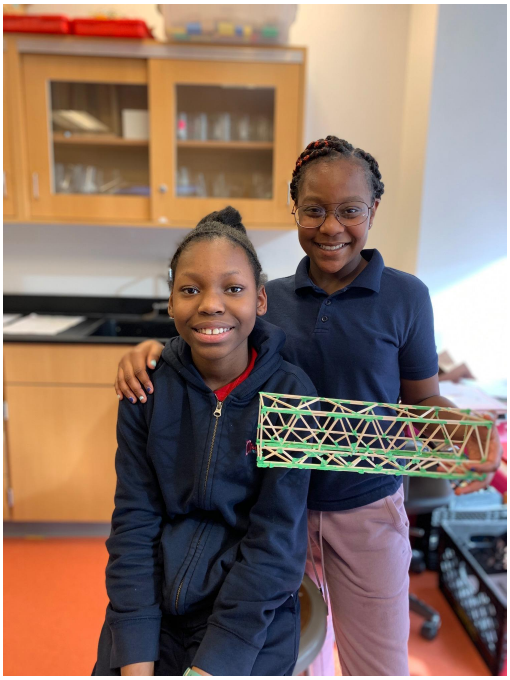
When was it done? By who?

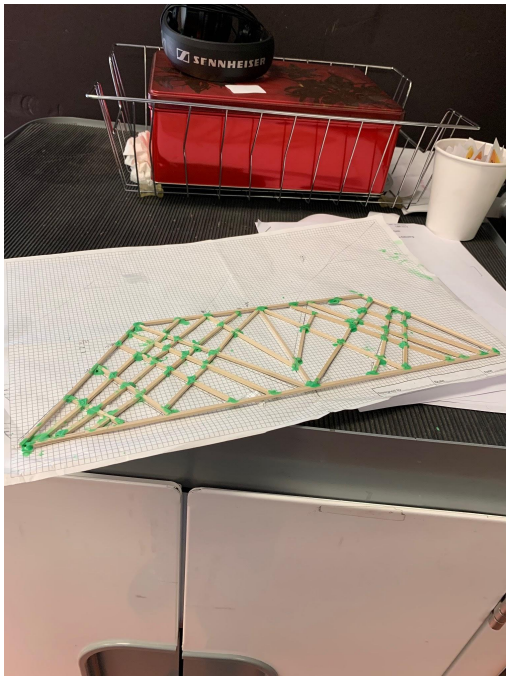
- Discovery Charter School, 2019-2020

Pictures:





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