



# Teacher Resource

## Civil Engineering

### Grades 3-5

We are so excited to have you utilize our Stem with Storm videos in your classroom! Innovation One and Education One have partnered together for some fun with our campus mascot, Storm, to share his love of learning with STEM- Science, Technology, Engineering and Mathematics with students near and far demonstrating some fun experiments directly aligned to Indiana State Standards!

The enclosed follow-up activities can be utilized for extended hands-on learning for your scholars. Our goal is to get those young brains thinking and spark the imagination and love of learning of future professionals!

Let's Learn Together with Storm!



A partnership of:



## Indiana Standards Connection:

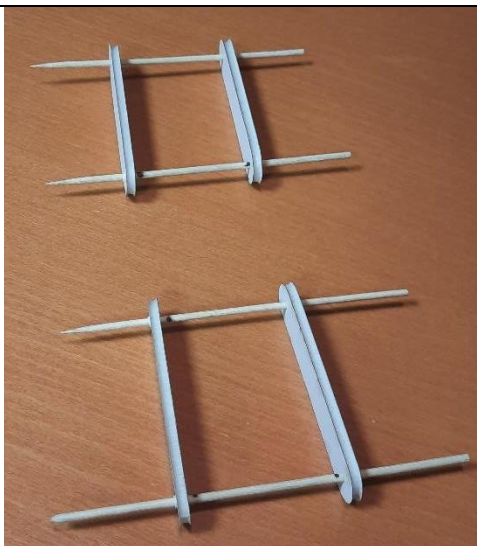
### Science Standards:

- 3-5.E.1: Identify a simple problem with the design of an object that reflects a need or want. Include criteria for success and constraints on materials, time, or cost.
- 3-5.E.2: Construct and compare multiple plausible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.
- 3-5.E.3: Construct and perform fair investigations in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved.

## Bridge Construction Instructions

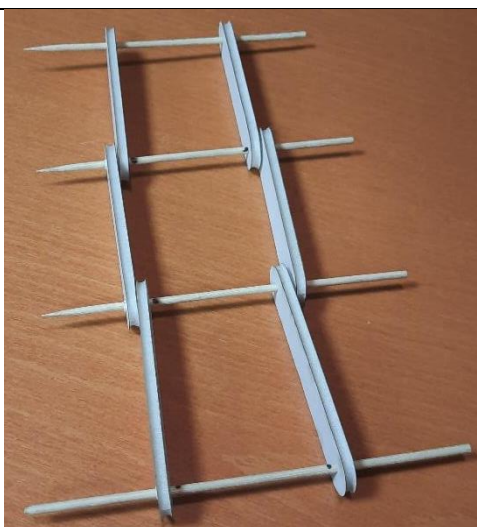
### Step 1

- Lay the four bamboo skewers parallel to each other on the table.
- Select two truss members and push a skewer through the hole at one end.
- Continue pushing until the member is near the black marks on the skewer.
- Push a second member onto the other end of the skewers, aligning over the black marks.
- Repeat with two more skewers and two more members.



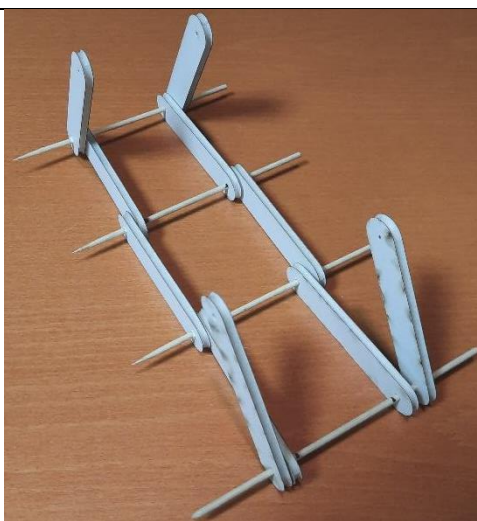
### Step 2

- Push two middle members onto the ends of the skewers used in the previous step.



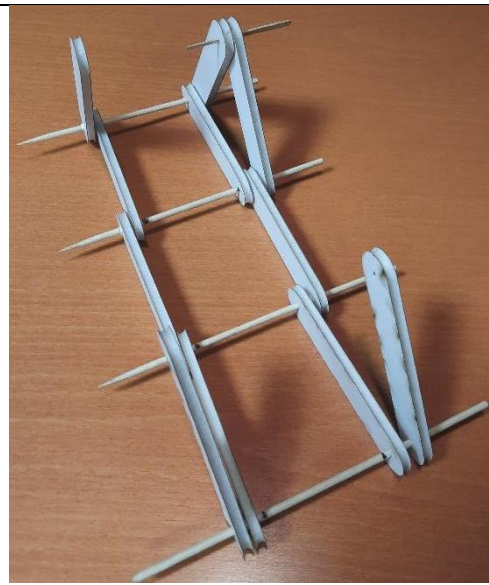
### Step 3

- Push members onto the ends of the skewers so that the member is inclined upward.

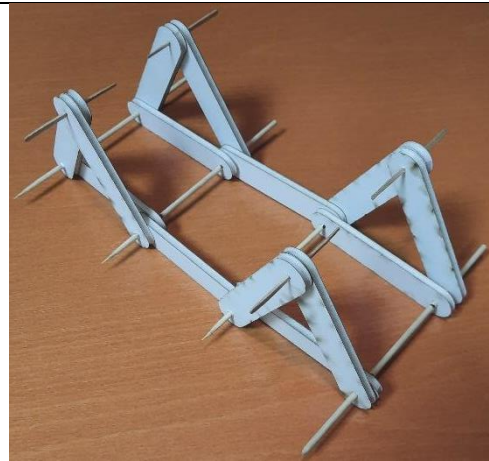


**Step 4**

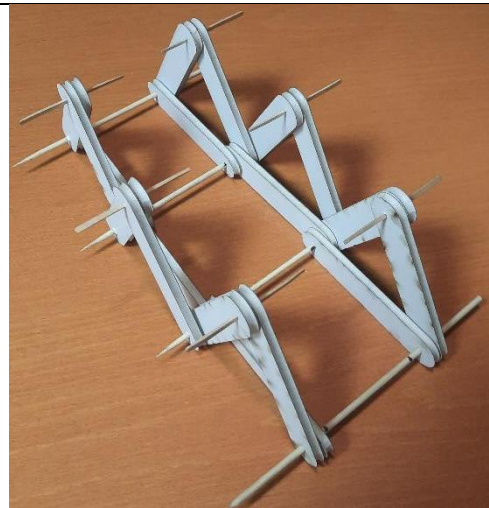
- In one corner add a member to the second skewer and incline this member towards the first.
- Push one the flat toothpicks through the top hole of the two inclined members, making sure that the point of the toothpick is towards the middle of the bridge.
- Notice that the two inclined members form a triangle with the horizontal member on the table.

**Step 5**

- Add the second inclined members at each corner.
- Use a toothpick to connect the ends, making sure that the tip of the toothpick is pushed in towards the middle of the bridge.

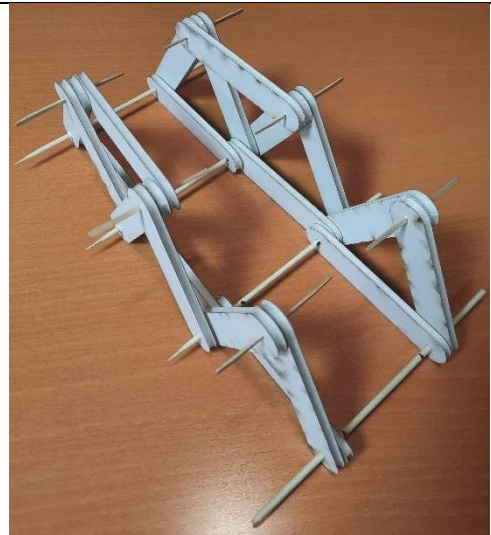
**Step 6**

- Add two inclined members to the middle of the bridge and connect with toothpicks.

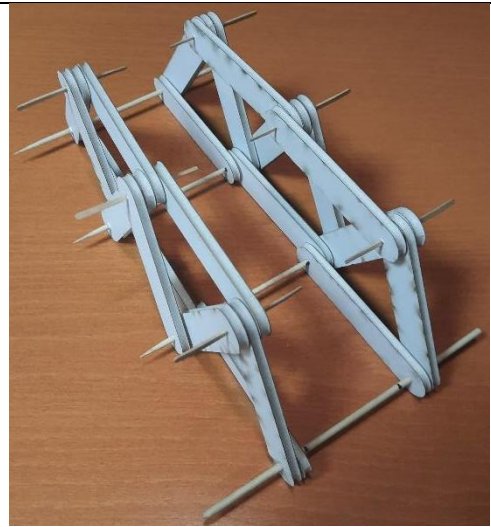


**Step 7**

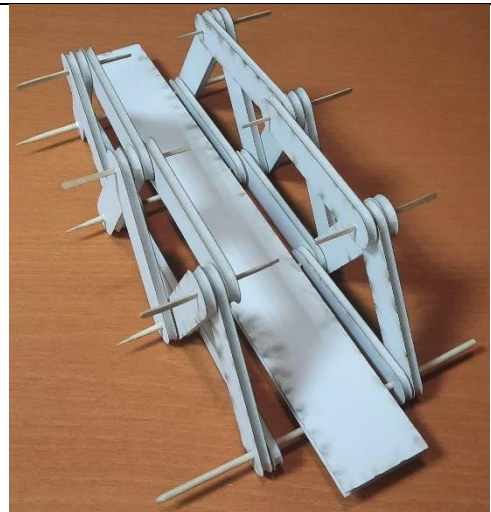
- Add a horizontal member at the top of one of two pairs of inclined members by pushing them onto the toothpicks.
- Add a second horizontal member on the other side.
- Notice that this forms more triangles.

**Step 8**

- Add two more horizontal members to connect the remaining inclined members.

**Step 9**

- Add the rectangular bridge deck by placing it on the skewers.
- The bridge is complete.





**Step 10**

- The ends of the bridge can be placed on two elevated surfaces, such as books.



**Step 11**

- A weight can be added to the bridge deck.

