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Spaghetti Bridges

Introduction:

Objective/Learning Targets

Create a bridge model from toothpicks and understand architecture/engineering principles. The design and construction require critical thinking and invaluable problem-solving processes. The activities provided here include hands-on experiences, collaborative problem solving, and an integrated approach to STEM.

Resources

Materials:

- Spaghetti (Creamette Spaghetti is thick and works well)
- Marshmallows both big and small
- Paper cup/bowl
- Paperclips
- Newspaper

Amount of Time: 40 minutes
Age Range: 4th grade and above

Warm-Up / Before Activity

1. **Optional:** use this PowerPoint to help guide through the warm-up activity.

2. **What makes a strong bridge?**
   - The triangle shape has been found to be the strongest in bridge building largely because its angles do not change significantly, thus buck, under stress as other shapes do.

3. Can you list some famous bridges you know? (Have students share)

4. Share with students some bridge models

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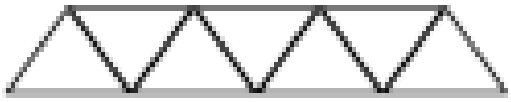
Construction

- Place newspaper on desk to avoid the desk from becoming sticky due to marshmallows.
- Begin by building the side framework of your bridge with spaghetti and marshmallows. The marshmallows should be used to join spaghetti to forms sides and ends.
- Start by building the top, bottom, and sides of the shape in the form of an isosceles trapezoid.

- Next add small pieces of spaghetti inside the framework to form triangles inside.



- Decide the best way to construct the top and bottom of the bridge and attach the sides.
- Keep in mind that you may split the spaghetti to design your bridge
- Keep in mind that right angles and triangle-shaped framework make stronger bridges.
- Test the bridge strength by placing a paper cup/bowl on top of the bridge and add paperclips to increase the weight that is placed on it. Count how many paperclips before it falls!

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Conclusion

- What geometric shapes make the strongest bridges?
- What else makes a bridge strong?

(Sample Spaghetti Bridge)