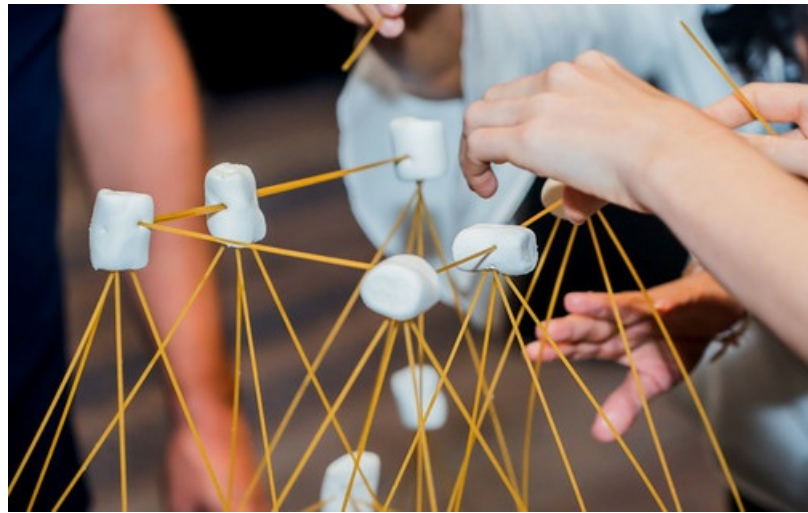


Design Challenge: Building a Bridge

This challenge is a great introduction to design thinking because it will capture your child's interest in a way that is fun and empowering. The task at hand is to design a bridge that is made out of marshmallows and toothpicks, focusing on its functionality. The bridge must be six inches long and able to hold four medium-sized paperback books.

We have laid out step-by-step instructions that are useful to follow as a guideline of the design thinking framework, but feel free to go beyond what we have written out. Your job is to help your child through the design thinking process by teaching them the importance of empathy, brainstorming, and prototyping. Each step in the design thinking process is essential, so make sure to complete each step in the instructions.



What You Need:

- Marshmallows
- Toothpicks
- Four medium-sized paperback books
- Tape measure or ruler
- Pen and paper for note-taking

What You Do:

1. Explain the prompt to your child by telling them that they have been asked to design a bridge that is six inches long and can hold four medium-sized paperback books.
 - a. Allow your child to play with a ruler so they can visualize six inches, and allow them to hold the four books so that they can have a better idea of how strong their bridge should be.
2. Next, ask your child to **define** a bridge and its purpose. If you'd like, feel free to look at pictures of bridges online so that your child can see a variety of designs. Remind your child that they should remember the purpose of a bridge when they start to make theirs. Some questions you can ask your child include:
 - a. What is the purpose of a bridge? (Potential answer: A bridge is a structure that connects two pieces of land across water. A bridge must be able to carry cars and other objects on it, and it must be able to stand on its own over a body of water.)
 - b. What, specifically is the purpose of your bridge? (Answer: To be six inches long and hold four books.)
3. Allow your child to **ideate**. Give them a pen and a piece of paper, and ask them to brainstorm various designs of bridges they can make using toothpicks and marshmallows.
 - a. If your child has a difficult time drawing or writing their ideas, feel free to talk it through with them while you write their ideas down on paper.
4. After your child has finished brainstorming, tell them to choose the design they think would be best. Refer back to their answers from step 2, and ask them to prioritize the purpose of the bridge when choosing which one to make.
 - a. This is an important step of the design thinking process because it teaches your child to prioritize the functionality of their design over their personal preferences. This also prevents them from getting too emotionally attached in case their design doesn't work.
5. Now, for the fun part: **prototyping**, or building! Give your child the marshmallows and toothpicks, and let them begin making their bridge.
 - a. Allow your child to work independently as much as possible, but be sure to help out wherever is needed.
6. Finally, it's time to **test** your child's prototype. Ask your child the following questions while they test out their bridge:
 - a. Does the bridge you created stand on its own without falling?
 - b. Does the bridge measure six inches in length?
 - c. Can the bridge hold four books without toppling?
7. If your child's bridge is unsuccessful in any way, make sure that they aren't discouraged. Frame their failure as an opportunity to try again, and help identify what parts of their design they need to improve. Take your child back to the start of the design thinking process, and repeat these steps until they have created a bridge they are proud of!