



4-H Club Sample Agenda - Engineering

Agenda Outline

WELCOME

As people are arriving, have them try to build the tallest tower with plastic/paper cups.

MEETING PURPOSE

Brainstorm our next field trip and complete an engineering challenge!

BUSINESS (5-10 MINUTES)

Remember if too much business is planned, members might not come back! Below is just a sample. See other [optional business items](#) on our Leading a 4-H Club web page.

- [4-H Pledge](#)
- Roll Call: Which is a stronger shape - Square or Triangle? (Answer: [Triangle](#))
- Recap what we did last time
- Brainstorm our next field trip
- Celebrate any member accomplishments!

EDUCATIONAL ACTIVITY - [Engineering challenge](#) (30 MINUTES)

[RECREATIONAL ACTIVITY](#) (10-15 MINUTES)

[REFLECTION](#) (5 minutes)

- How did we do?
- How did we live out the 4-H Pledge today?

REFRESHMENTS





Educational Activity - Engineering challenge

4-H Project Area

Engineering design, STEM

What it is

Experience the engineering design process by designing and building a structure that is as tall and strong as possible, using only marshmallows and spaghetti to support some weight.



Why it matters

Engineers are great problem solvers. So even if we never become engineers ourselves, the engineering design process can help us develop our problem solving skills!

Getting started

Time: 30 minutes (or whatever is needed to complete the activity during your meeting)

Materials:

- 20 unbroken pieces of uncooked, long pasta, such as spaghetti noodles.
- 30 small marshmallows
- Measuring tape or ruler
- Coins, marbles, washers or books (for weight test)

Prep for participants:

- If you don't have a budget to provide supplies yourself, let families know ahead of time to bring the supplies listed above. Have extra for families that might forget.
- If meeting virtually, let families know ahead of time to gather the supplies listed above.

Background

Have you ever wondered how really tall buildings stay up? Why do skyscrapers not fall down when the wind hits them? Engineers work with architects and scientists to understand what makes materials break and then use what they learn to design strong structures. Today, you will have the opportunity to figure out how to make a strong structure, too. Sometimes, engineers may be able to find very strong materials, but they cannot use them in a structure because the materials are too expensive. Your challenge today is to make a strong structure using weaker materials.



As you complete this challenge, you'll be using the [engineering design process](#). We've given you the challenge, and then you'll **imagine** some solutions to the challenge, you'll **plan** out your design, you'll **create** your tower, then **test** it, and finally, you'll **improve** it based on how the test went. You'll repeat this process again and again. This means you'll have some failures as you test out your ideas. It's all part of the problem-solving process!

How to do it

1. Before they construct their tower, use the background information to talk through what they're about to do. Talk about the materials they have. Spaghetti noodles aren't very strong, so how can you build a tower with them? In our check-in, we mentioned triangles being the strongest shape. Why is this? How could you use triangles to create your tower? What else could you try?
2. Briefly talk through the engineering design process using the background information.
3. Have your members work together as families/teams to create a tower using spaghetti noodles and marshmallows. (COVID pandemic consideration: Ensure families are working together in their own pods for safety.)
4. Teams can use a yardstick or tape measure to measure the height of their tower.
5. For a test of strength teams can use different weights to see how much weight their structure can hold. Some examples of weight could be metal washers, books, marbles, coins. Just be consistent with the weight and keep track of how many you put on your tower.
6. Maybe have some prizes to award the winner.
7. Reflect as a group:
 - Which structures held the most weight, regardless of the success or failure of the materials used?
 - Which geometric shapes seemed the strongest for holding weight — triangles, squares, or circles?
 - As a club, when we work together, how can we be like a tower?
 - As a club, is there a community pride project we can do to make our community stronger?

Additional Resources

See a demonstration of how to teach the spaghetti tower challenge:

https://www.youtube.com/watch?v=RovwHupQ_Dk

Recreation Ideas

Family Pyramid: As a family create a human pyramid. The family who creates the first pyramid wins!



Bowling towers: Have the family members (in their pods) create a tower using paper or plastic cups. Then have them have a bowling party to knock the tower down.

Spaghetti tower activity adapted from Yakacki, C., Heavner, B., Schaefer Zarske, M., & Carlson, D. (2004). *Leaning tower of pasta*. Regents of the University of Colorado.

https://www.teachengineering.org/activities/view/cub_mechanics_lesson10_activity1

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