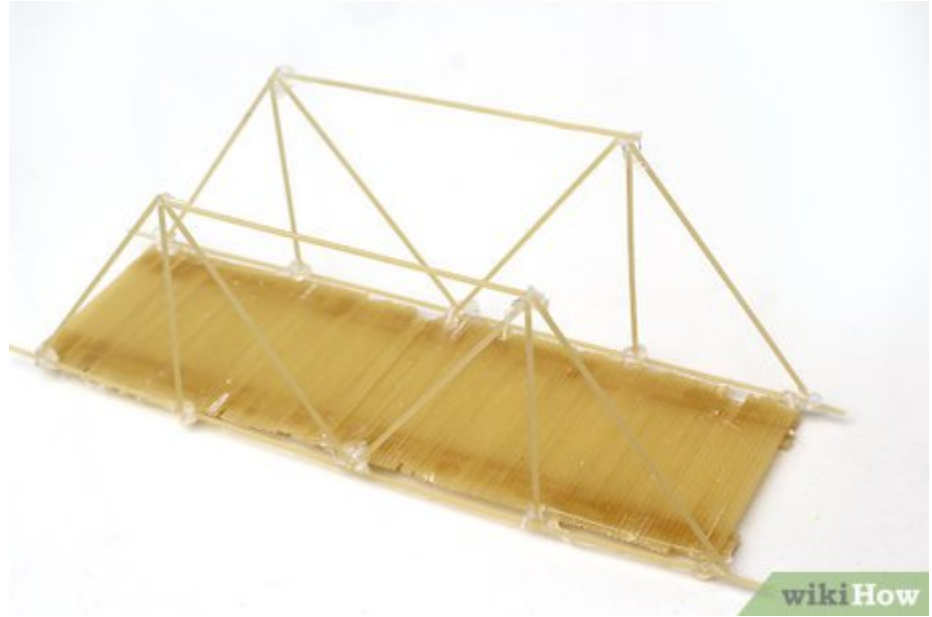


Marshmallow Design Challenge

Have you ever wondered how engineers collaborate to design, test, and improve on their ideas, as well as examine hidden assumptions that can derail the creative process and final products? Do you understand the physics behind engineering including: the forces working both for and against structure; what creates surface tension; how the distribution of mass is an important consideration when designing; and how compression can affect the stability of any given object?



Many people in different branches of engineering work to build bridges. Civil engineers are responsible for design and construction of such structures, however they also work with mechanical engineers and material engineers to design the most stable structures. These engineers must consider many variables when creating plans, such as the distance to be spanned, where the bridge is being built, the expected type of traffic it will have to withstand, materials available, budget and what the bridge will look like.

Who do you think creates the human-made structures in our town? Who makes sure they are safe for us to use? (Listen to student ideas.) It is civil engineers who design and create structures such as buildings, dams, highways, skyscrapers and bridges. Engineering uses the engineering design process to design successful bridges. We can explore the field of engineering and follow some of the engineering design process steps by making bridges.

Goal: Help all students understand not only the physics behind engineering, but also the importance of collaboration.

Challenge: Your engineering design challenge is to design a bridge that can hold the most weight before breaking. Like engineers, you will be given constraints- in this case, you can only use spaghetti and glue to construct your bridges in the time allotted. We can then test them by applying weights to see when they break. Let's get started!

Materials: spaghetti noodles, tape, marshmallows, weights for testing

Constraints:

1. Build the strongest spaghetti noodle bridge: The winning team will be the one that will hold the most weight.
2. Bridge must be free-standing and include a road bed: Road bed must be able to hold weight.
3. Use only materials provided: You can use only the given supplies. You are allowed to break materials as needed.
4. Only use time provided: Will only have a specific amount of time to complete the project: 25 minutes.
5. Limitations: During the project you will be given limitations usually encountered in the workplace. You must find a way to work as a team to complete the project.