

MAKE YOUR OWN TINKER TOYS

Do you like to create and build things? Have you ever tried to design a building, like a house or a tall skyscraper, and then build what you created? With practice, the right classes in school and a good set of **tinkering** skills, you could grow up to become an architect or an engineer.

To **tinker** means to make small changes to something, especially in an attempt to repair or improve it. An **architect** is a person who designs buildings.

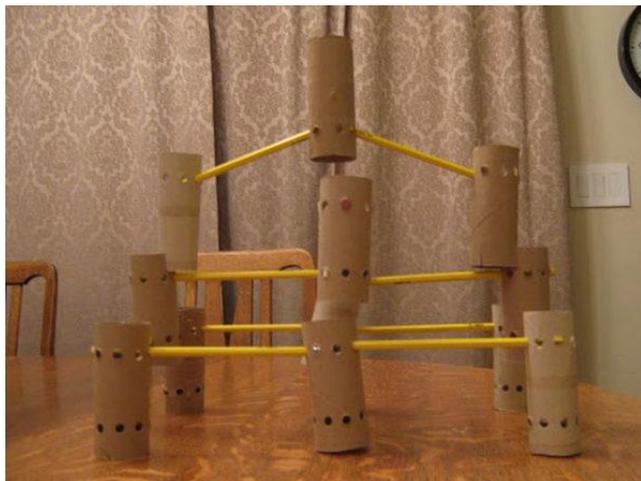
An **engineer** is a person who designs, analyzes, builds, and tests machines, systems, structures, and materials.

It's fun to sketch your designs on paper, and then color the results with crayons, colored pencils or paints. Once you are satisfied with the way your design looks, then it's time to build your structure. You can use building sets that you might already have, like plastic bricks or wooden blocks, but you can also create your own set of simple tinker toys with cardboard tubes saved from empty rolls of toilet paper and paper towels.

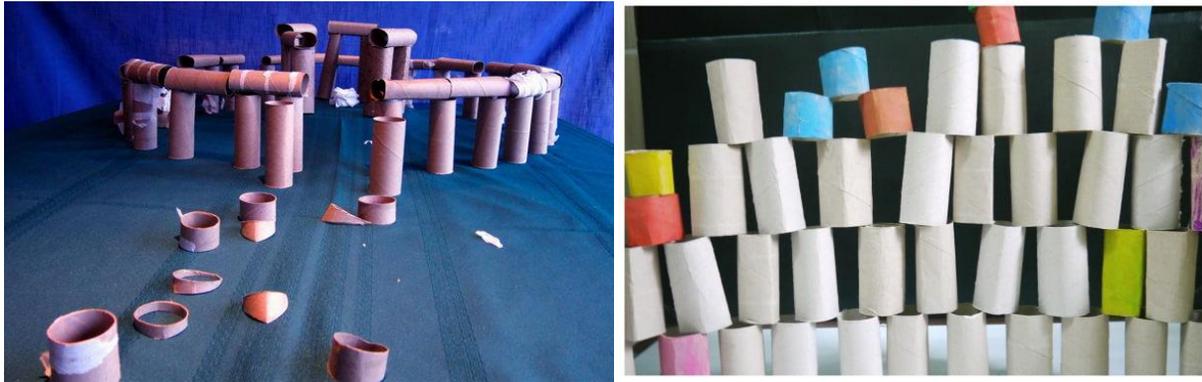
You just need a few supplies to get started making your tinker toys:

- cardboard tubes
- straws, pencils, pipe cleaners, etc. (to make connectors for joining the tubes together)
- handheld single hole puncher (to make holes in the tubes for the connectors)
- scissors

Cut the tubes to the desired length, or leave them as they are. Punch a few holes along the edges of the tubes, cut some slits at the edges to make the tubes fit together, then add the connectors for another way to join the tubes together. You can also just balance the tubes on top of each other or tape them together if you don't have a hole puncher handy.



Now, it's time to build the design that you sketched, or you can look for inspiration in books or online. Here are a few simple ideas to consider:



ADDITIONAL INFORMATION AND MORE RESOURCES

Famous engineers:

Edith Clark was an electrical engineer who brought sophisticated electrical engineering concepts to dam building in the western United States. She also received a patent for her specialized “graphical calculator”, which was used to solve electric power transmission line problems.

Henry Ford was an engineer who founded the Ford Motor Company. He developed assembly and production lines that brought about mass production – resulting in the first motor car that an average person could afford.

Elon Musk is a South African-born engineer, inventor, and businessman known for the Tesla car, SolarCity, SpaceX, and the idea behind the Hyperloop.

George Stephenson was a civil and mechanical engineer who developed and built steam locomotives for some of the very first railways. He is sometimes referred to as “the Father of the Railway”.

Nikola Tesla was an electrical engineer who didn't receive credit for a lot of his inventions. His inventions include the induction motor, 3-phase electricity, fluorescent lighting and the Tesla coil. He also developed the AC current generation system made from a transformer and a motor.

<https://nevershushed.com/2015/08/19/homemade-tinker-toys/>

<https://tinkerlab.com/toilet-paper-roll-marble-run/>

<https://stemtropolis.com/stem-activities-with-toilet-paper-rolls/>

Famous architects:

Antoni Gaudí was a Spanish architect whose works have a highly individualized, one-of-a-kind style. Most of his projects are located in Barcelona, Spain.



The Basílica de la Sagrada Família in Barcelona, Spain.
Designed by Antoni Gaudí.



The Dancing House in Prague, Czech Republic.
Designed by Frank Gehry.

Frank Gehry is a Canadian-born American architect whose trademark style had become buildings that include bits of free-form sculpture. A number of his buildings, as well as his private home, have become world-famous attractions.

Zaha Hadid was an Iraqi-British architect and the first woman to receive the Pritzker Architecture Prize. She was known as the "Queen of the curve", famous for taking the strongest materials and using them to form objects that look soft and sturdy at the same time.



The Heydar Aliyev Center in Baku, Azerbaijan. Designed by Zaha Hadid.

Julia Morgan was an American architect and engineer. She designed more than 700 buildings in California during her long career. She is best known for her work on Hearst Castle in California.



Hearst Castle in San Simeon, California. Designed by Julia Morgan.



Fallingwater in Mill Run, Pennsylvania has been called "the best all-time work of American architecture". Designed by Frank Lloyd Wright.

Frank Lloyd Wright was an American architect who developed "organic architecture", which means designing structures in peace with humanity and its environment. His creative period spanned more than 70 years. He designed more than 1,000 structures, of which 532 were completed.