



8+

Invent

Boundless Bridges

What will
yours
look like?

Spark!Lab is a real place located in the Smithsonian's National Museum of American History. It's a hands-on invention activity center where visitors learn that invention is a process and that everyone is inventive.

Activities incorporate history, science, engineering, technology, and art. A visit to Draper Spark!Lab "sparks" imagination and curiosity, and can be the first step to exploring our own inventiveness and invention in the world around us.

To learn more, visit us at: <http://www.invention.si.edu/try/sparklab>

in collaboration with

Creativity for Kids
by FABER-CASTELL

Invent Boundless Bridges #3615000
Faber-Castell USA, Inc. • Cleveland, Ohio 44125

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Inventor's Guide

WARNING:
FUNCTIONAL SHARP POINT

Did you know that we are surrounded by invention?

Life today is much easier, safer, faster and more convenient thanks to creative problem solving through invention. Since the beginning of time, people have used their imaginations as a way to solve a problem or overcome a challenge...

Your Challenge:

Your best friends are vacationing on a sunny island miles away. You see their super fun photos and would love to join them, but the only way to get there is to build a bridge. It's up to you, the inventor, to create your own unique bridge design with what you've been given in this box. Welcome to the wonderful world of inventing!

A Bridge...

can be natural or man-made; it could be a tree trunk over a stream or it could be an engineering masterpiece crossing a large body of water. Plenty of bridges have been made over the years, and now it's your turn.

Real inventors follow a process as they create. Learn what the steps are by going through your own journey of invention. You may skip ahead or re-visit a step along the way. Let's begin!

To invent
you have to:



THINK IT

Have a great idea for
an invention.



EXPLORE IT

Investigate inventions and
ideas of the past.



SKETCH IT

Draw pictures and diagrams
to figure out how your
invention might work.



CREATE IT

Build a prototype or
model of your idea.



TRY IT

Test your invention.



TWEAK IT

Keep improving your idea.



SELL IT

Market your invention to
people who might buy it.

THINK IT

Think of what kind of bridge you would like to create. Remember, ideas can be limitless! There are no bounds to your fun, incredible thoughts.

1.) What will the bridge cross over?

2.) Who will use the bridge – people, cars or both?

3.) How tall and long will it need to be?

EXPLORE IT

What are bridges made of and why? How does a bridge stand up? What kind of bridges have you seen that might be useful to your design?

Bridges are engineering marvels that span all sorts of spaces and require a lot of planning before building.

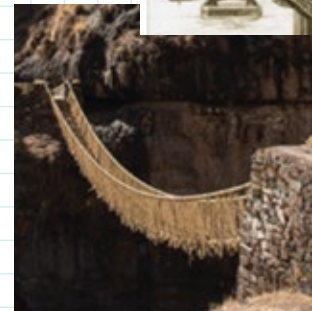
Seen here are three types of bridges:



← • An 1879 patent model of a truss bridge made by Philip Jarvis;

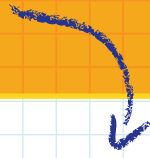


← • A drawing of the Benjamin Franklin Bridge spanning the Delaware River, connecting Philadelphia, Pennsylvania and Camden, New Jersey;

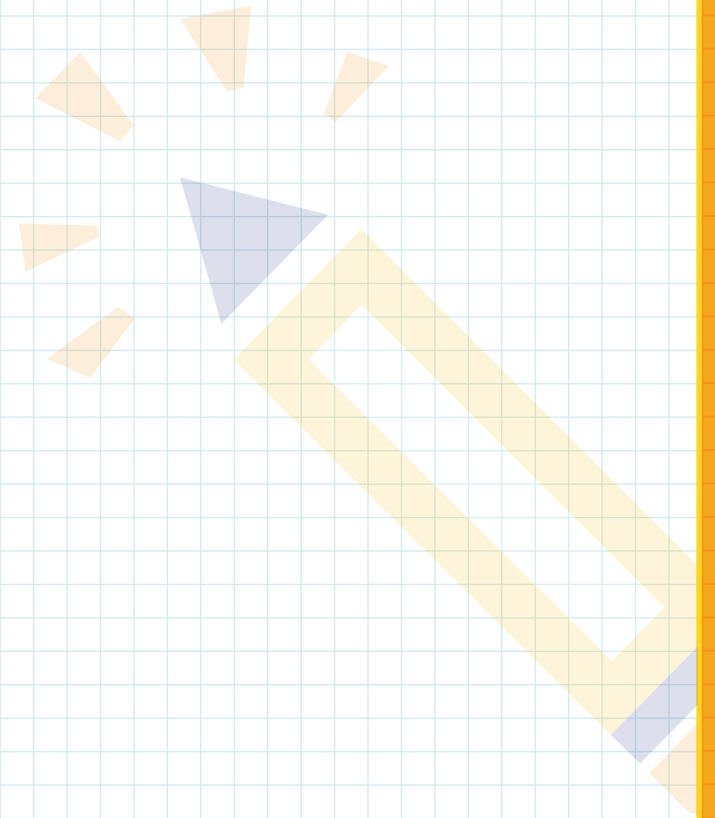


← • A rope suspension bridge crossing Peru's Apurimac River in South America; this particular bridge is hand-made every year.

SKETCH IT



Use the space provided to do a few quick sketches of what your bridge could look like.

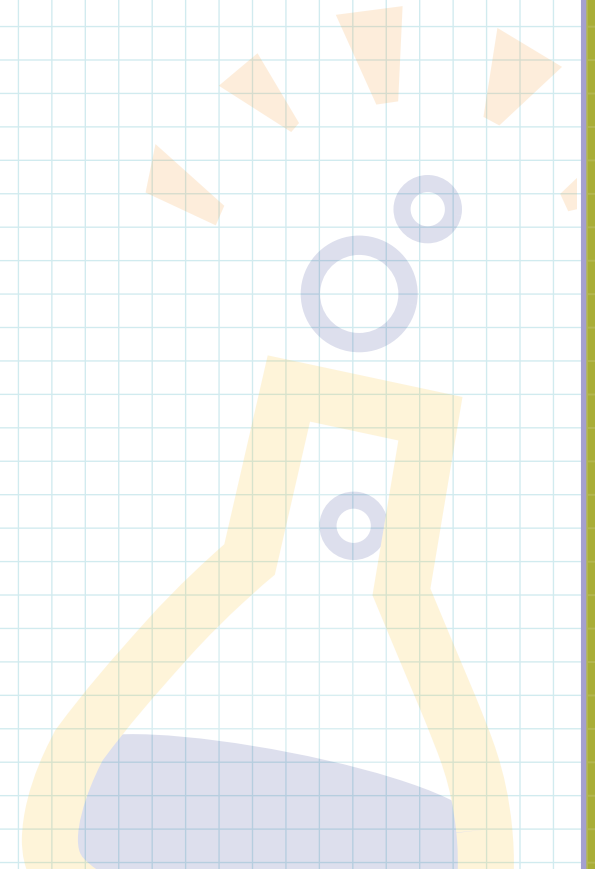
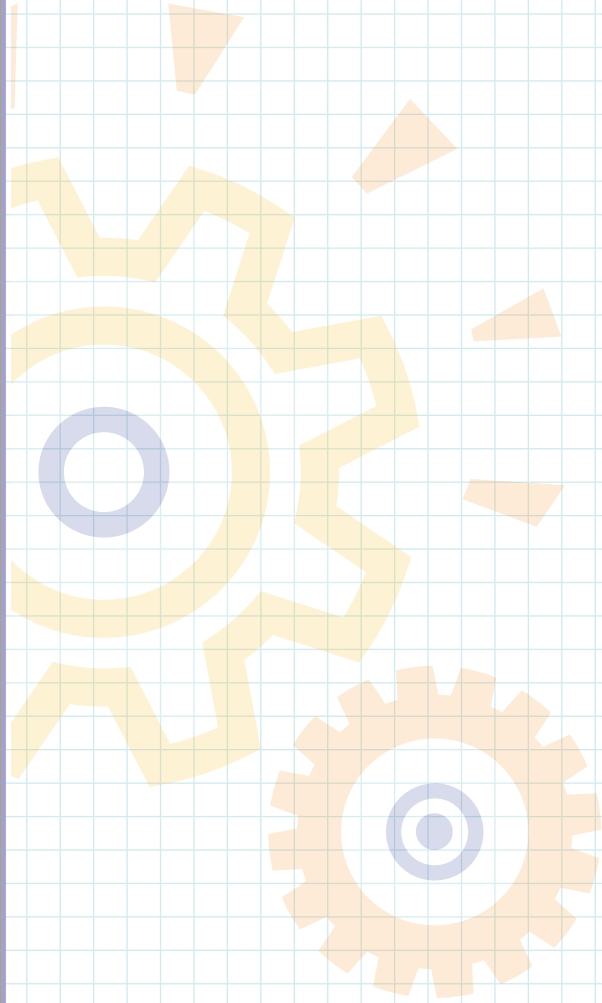


CREATE IT

Start putting your pieces together to build your creation. Carefully explore the materials you have. Think about which items will help your bridge look and work the way you imagine.

TRY IT

Does your bridge work like you thought? If yes, congratulations! If not, think about how you can improve or tweak it.



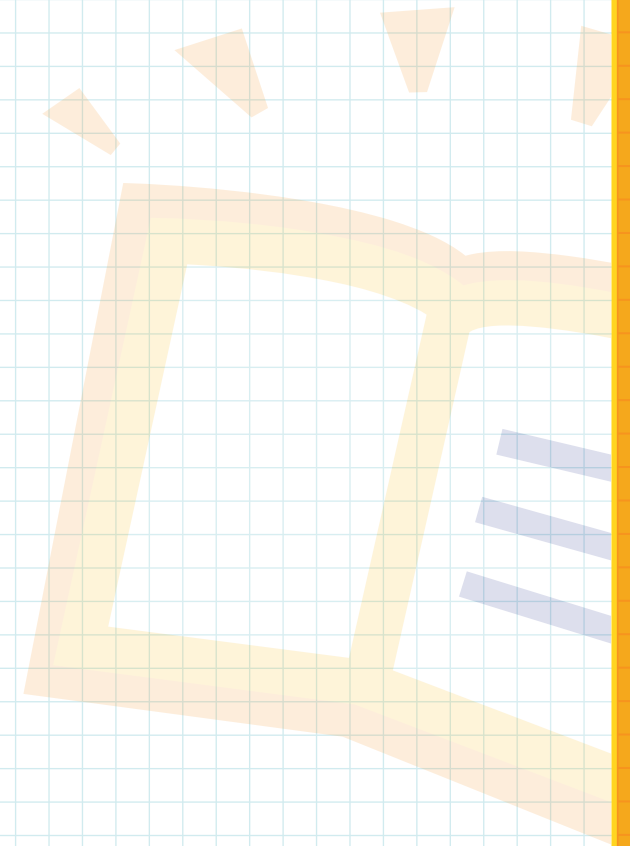
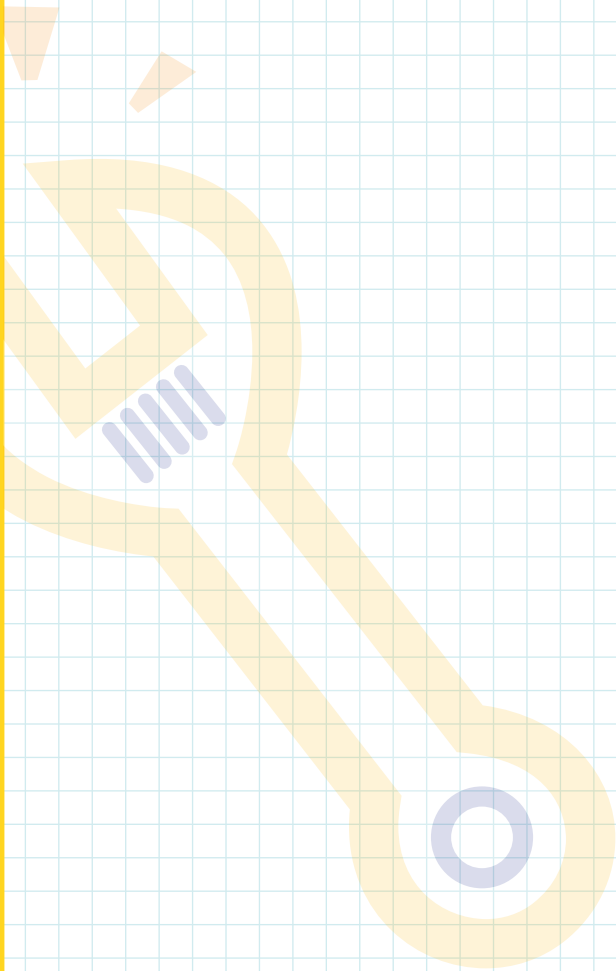


How could your bridge be better? Ask friends and family for their ideas. Make changes you think will make your bridge better.




How would you sell a bridge? Talk to your friends and family about your bridge to see what they think about your design and how to sell it.

- What would your sales pitch be?
- Would you put an ad in a magazine, a newspaper or on TV?
- What would you name your bridge?



Helpful Tips:



The sticks provided are different weights. Some are thicker and some are thinner. We recommend using the thicker sticks for the main structure and base of the bridge.

You will see holes and notches in your sticks. Explore how they fit together.



Wire is available for suspending pieces or holding pieces together. It is easy to bend and easy to cut.

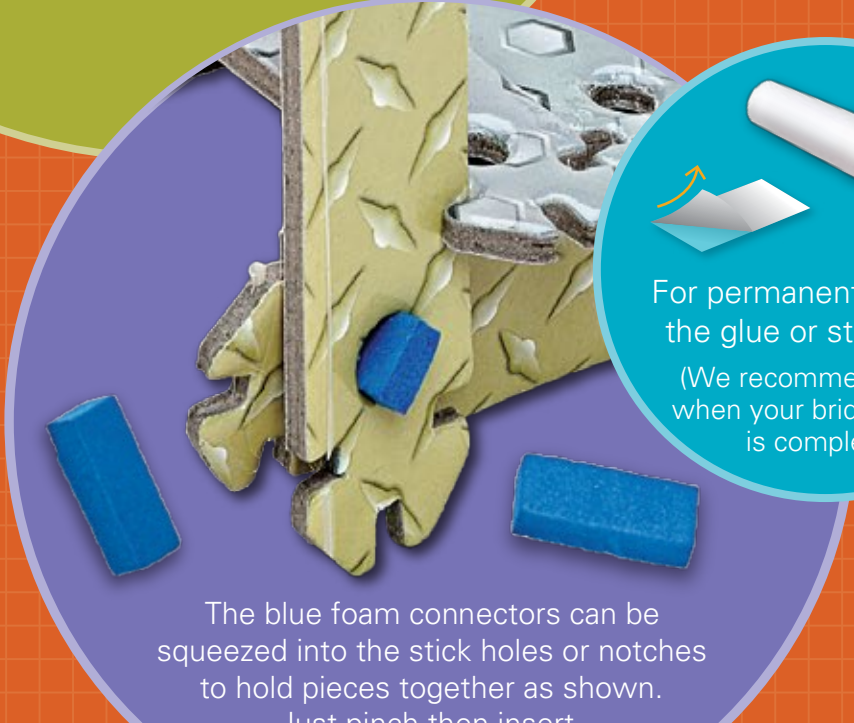


Use the brads as connectors. They allow the sticks to rotate.



For permanent hold, use the glue or sticky tabs.

(We recommend gluing when your bridge design is complete.)



The blue foam connectors can be squeezed into the stick holes or notches to hold pieces together as shown. Just pinch then insert.

The threader is a tool to help weave or string the cord.

Thread the straws together to create a bridge with motion. Use the needle threader to help thread the straws.



Project Hack!

Using items found around the house, try to create another bridge or enhance the one you've just made. Always ask before taking and using.



How we made a Rope Bridge

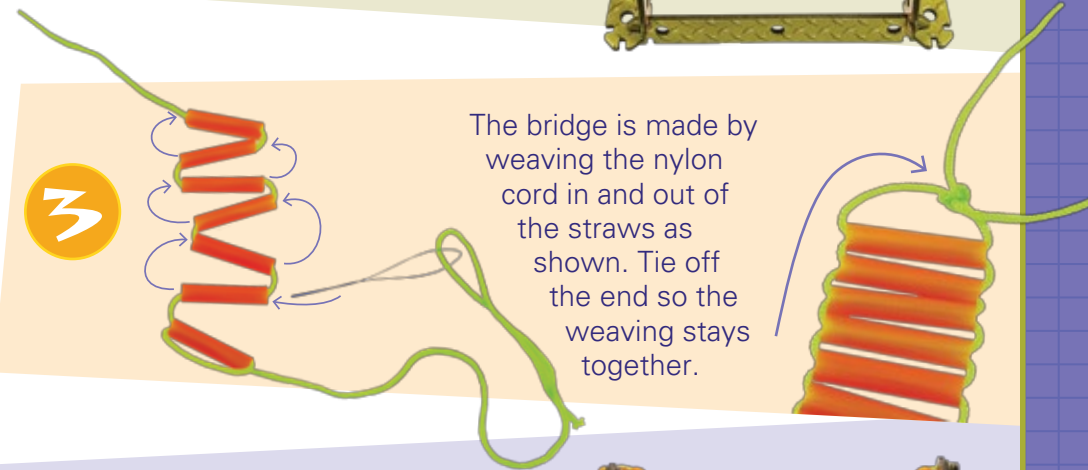
- 1 Start with a stable base. We used the thick sticks in a rectangular shape.



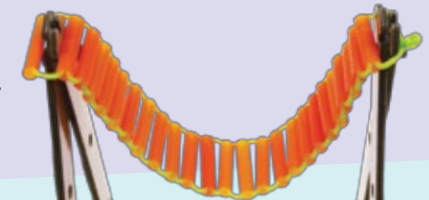
- 2 Next, we used foam connectors with the long, thick sticks to create support beams. These hold the bridge up.



- 3 The bridge is made by weaving the nylon cord in and out of the straws as shown. Tie off the end so the weaving stays together.



- 4 Drape each end of the bridge over the support beams.



- 5 Add stability to your structure by placing small dabs of glue where any of the sticks meet.

