



MISSION MISSION POSSIBLE

IMAGINE. DESIGN. CREATE.

MISSION : Build a Bridge

Your mission is to build a bridge strong enough to hold a toy... using only paper!

WHAT YOU'LL NEED

- Paper (newspaper, printer, notebook or construction paper will all work)
- Tape (scotch tape or masking tape)
- Small toy (less than 6 inches works best)
- Two surfaces about the same height (Example: chairs, tables, boxes, etc.)
- Optional: Pencil, pen or crayon
- Optional: Ruler, yardstick or tape measure.



LET'S READ

Find a comfortable spot and read! Here are some ideas to get you started:

- Bridges are to Cross by Philemon Sturges
- Steven Caney's Ultimate Building Book by Steven Caney
- Trouble at the bridge by Marie Birkinshaw
- Eyewitness Funfax Super Structures by DK Publishing

You can download digital copies of these books for free from openlibrary.org. Here is how!

1. Go to openlibrary.org.
2. Click the blue "sign up" button on the top right to create a free account. You will be sent a confirmation email.
3. Sign in.
4. Type the book title and author into the search bar.
5. Find your book and click the blue "borrow" button.
6. Don't forget to return your book when you are finished reading it!



Sam Noble Home



For more activities visit samnoblemuseum.ou.edu/samnoblehome

Get Started:

1. Set up two surfaces that are one arm's length apart (about 2-3 feet) and about the same height. It could be two chairs, two boxes, or even a table and back of chair.
2. Gather your supplies and toy.
3. Look at your supplies, toy and where you will build your bridge:

THINK!

- How can you use the paper and the tape together?
- How wide does your bridge need to be to hold the toy?
- What can you do to make sure the bridge won't fall down?
- How much paper will you need?
- How much tape will you need?
- Optional: Draw what you want your bridge to look like.

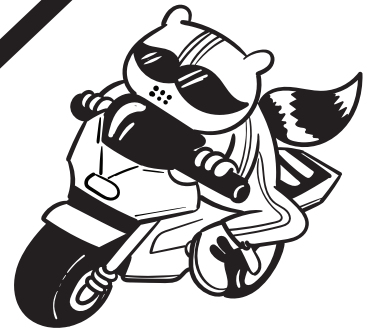
4. Build it!
5. Once you have connected the bridge to both surfaces, place your toy in the middle.



WHAT HAPPENED?

- Did the bridge hold the toy?
- Did the bridge fall down?
- Did the toy fall off but the bridge stayed up?

6. Try Again! Just because your idea didn't work the first time, doesn't mean you should give up. Think about how you can change your idea to build the bridge in a different way so it will hold the toy. Be creative and try as many times as you want. Ask for ideas from an adult or buddy if you've tried all of yours. (If you need some hints, check out the next page.)



DID YOU KNOW?

A bridge is something that makes a path over an obstacle. We build bridges to cross rivers, roads, canyons—and even to play on at the playground! Have you ever crossed a bridge before?

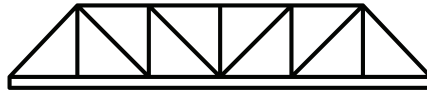
TIPS

- Make sure you have attached both ends of the bridge securely to the surfaces.
- If the toy rolls or falls off but the bridge stays up, think about making a rail on either side to hold it in. Or try making the paper layer thicker with more sheets.
- Try rolling the paper up to make support beams under the bridge.

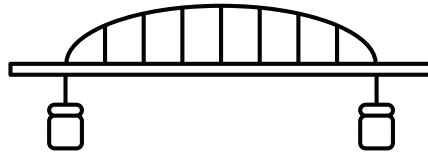
Bridges come in many shapes and types. Does your bridge look like these bridges?



Beam Bridge



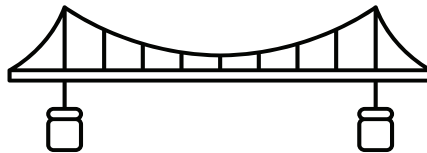
Truss Bridge



Tied Arch Bridge



Arch Bridge



Suspension Bridge

HELPFUL WORDS

Arch: a curved structure spanning an open space

Beam: a flat surface supported on each end

Cable: a wire used to hold up bridge surface

Buckle: when something bends under pressure or weight

Deck: the flat surface of a bridge

Force: any action that maintains or alters the position of a structure

Footings: the part of the bridge supports that are connected to the ground

Joint: something that connects two or more adjacent parts of a bridge

Load: weight that is held by a bridge

Pier: a vertical support holding up a bridge

Span: the length a bridge extends between two supports

Tension: a stretching force that pulls on a material



When you're done, share what you did with someone!

TELL THEM

- Did it work on the first try?
- How did you change it to make it hold the toy?
- How many ideas did you try?
- What was hard about the challenge?
- If they wanted to build a bridge like you, what should they do?

BONUS CHALLENGE

Now that you're a bridge builder, see if you can design a bridge that is:

- Twice as long
- Strong enough to hold three toys or a heavier object (like a can of soup.)
- Challenge an adult or buddy to make the longest bridge using the same materials. (example: Everyone has 30 minutes, 8 sheets of paper, 1 foot of tape.)

Want to learn more about bridges and how things are built? Check out the links below

Bridge Basics

<https://www.pbs.org/wgbh/buildingbig/bridge/basics.html>

What Makes Bridges So Strong (Video)

<https://www.youtube.com/watch?v=oVOnRPefcno>

Design and Engineering Videos for Kids

<https://pbskids.org/designsquad/video/>



Talk like a bridge builder!

1. The load on my bridge was a (name of toy or object).
Optional: Weigh your toy to see how heavy it was!
2. The deck of my bridge was made out of paper.
3. My bridge did/did not buckle when I put the toy on it.
4. The joints on my bridge were made from tape.
5. My bridge did not have any cables.



MISSION ACCOMPLISHED