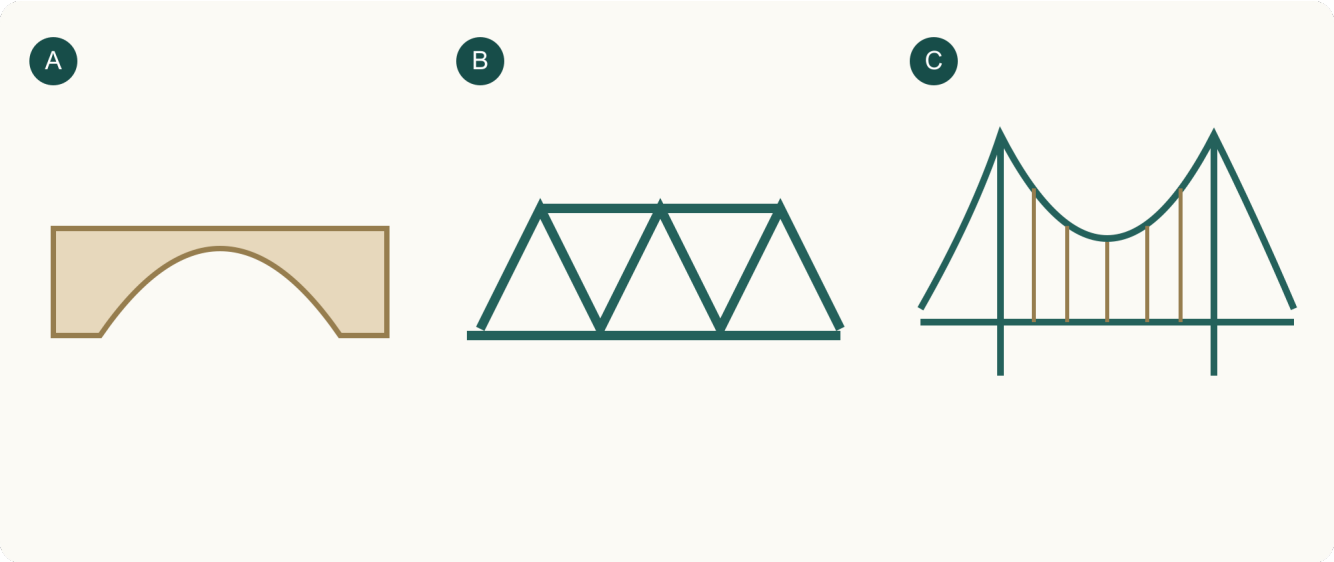
Bridges for a school project: compare arches, trusses and suspension bridges

Upper primary: compare structures and test a design



Learning diagram: A Arch · B Truss · C Suspension

Materials

Two identical paper strips, each 20 × 6 cm · Two equal-height books as supports, ruler and pencil · Up to ten identical coins, handled with an adult · Paper for a results table; scissors with adult help

1. Trace the deck and supports in A–C. For the test, leave one strip flat; fold the other lengthwise along three lines spaced 1.5 cm apart, alternating up and down to make an accordion cross-section.

2. Place two level supports 10 cm apart. Lay each strip across the gap in the same direction. Add identical coins one at a time at the midpoint. Stop when the paper touches the table, slips, or reaches ten coins; keep hands and faces clear.

3. Record paper type, coin count at the stopping point and what happened. If it holds all ten, write “at least ten in this test.” Repeat with fresh identical strips. This compares two paper beams, not the load capacity of A–C.

My observations and explanation

Checks and explanations

1. A is an arch, B a simplified truss and C a suspension arrangement.

2. A fair comparison changes one feature while keeping the chosen conditions constant.

3. Results apply to the tested paper setup, not automatically to a real bridge or an AI model.

Look beyond the outline

Find the deck and the supports in each diagram. Trace a possible route from the deck toward the ground. The drawings simplify real bridges: foundations, joints and many other details are omitted. A triangular-looking decoration alone does not make a reliable truss.

Choose one question to test

For a paper-bridge test, ask how a fold changes the load a sheet can carry. Keep paper type, span and loading method the same. Change one feature at a time. This material test is separate from generating a digital bridge miniature.

Record and improve

Sketch the design, note where it bends and record the loading method. Repeat a comparison rather than judging from one attempt. Explain a change you would make next. An attractive render is not evidence that the bridge can carry a particular load.

For parents and teachers

Choose an easy, low tabletop setup and agree on how to compare loads. Help the learner record evidence rather than announcing which design must win. Help measure and fold the paper, handle coins and scissors, and keep small parts away from younger children.

What the model can and cannot show

The diagram is a structural sketch, not an engineering analysis. Neither it nor a generated 3D model certifies load capacity, connections or printability.

Check observations against your textbook and the sources below.

TeachEngineering: Building Bridges · https://www.teachengineering.org/activities/nyu_bridge_activity1

LehrplanPLUS: Heimat- und Sachunterricht 4 · https://www.lehrplanplus.bayern.de/fachlehrplan/grundschule/4/hsu

Deutsches Museum: Brücken bauen · https://www.deutsches-museum.de/museumsinsel/programm/angebot/museum-on-demand-bruecken-bauen