



## STEAM Activity

### Name of the activity

Building a bridge

### Target age

4 - 6

### Context

How can we build a bridge that supports a lot of weight?

### Goals (STEAM Skills developed by students through this activity)

- Science:

The students explore different materials.

The students experience the difference between solids.

The students experience the influence of liquids on solids.

The students investigate the factors that influence the quality of materials such as wind, material, water, ... and how they can protect these materials against them.

- Technology:

The students can attach materials to each other.

The students can build a bridge between two objects over different distances.

The students can use a self-made plan to build the bridge.

- Engineering:

The students look for a way to make their bridge as strong as possible. The students draw a draft of their bridge.

The students investigate the operation of an arch bridge.

The students can analyze and adjust their design and construction.

- Art:

Can you make an original, special design. Are you using colors or extra materials to make your bridge an artistic construction?

- Mathematics:

The students can think of a way to cross over the given distance.

The students determine how the weight can be distributed and what influence this has on the bridge.

The students determine how the weight can be determined.

The students investigate the effect of the geometric shape on the robustness of a construction.

**Methodology** (describe step by step how the activity has to be carried out by the students and how teachers have to present it)



Teacher start to read a letter from the mayor of the city:

Dear children,

Here the mayor speaks. I have been looking for a long time to build a bridge in our city and therefore I need your help. I am not sure how large and strong the bridge must be, so I call you all for some help. You can build a small size bridge that is strong enough and not collapse if there is a cyclist, a car or a tractor crosses the bridge. I want a wide or a long bridge so that many people can cross it.

I want a photo of the strongest bridge that can carry the most weigh

.

Good luck,  
The mayor

**Materials** (list all materials and resources needed to carry out the activity)

Straws, toothpicks, tape, cord, paper, ...

**Challenging questions** (list the questions that help students to move forward and to reflect on what they are doing)

- What are the criteria

The bridge must be able to carry as much weight as possible. The bridge must be wide OR lang.

**Assessment** (survey / questions for the students to evaluate if the objectives of the activity have been achieved)

Step 1: the design:

Questions: What is our problem

What material will you use? What are the needs of your materials? What must a bridge meet?

Step 2: designing, testing:

Examine the materials that you offer as a teacher (everyone knows the materials, everyone can name the materials). The students build a bridge with the materials they believe are the strongest. (occasionally consider the criteria the bridge must meet)

researchin

:

The children's bridge is tested with the weights that the mayor has give

. Examine the weights. Which are the heaviest? Which are the lightest? (do this first with hands and then with the balance scale).

Questions: What are you doing? Why are you doing this? Why do you choose these materials?

Could it be otherwise? How can you check whether this material is suitable? Which bridge is the longest so far? How many weights could the bridge already hold?

Step 3: analyze and optimize the design:

- Analyze the design in terms of the criteri

: Which bridge, according to them, can carry the most weights? The pupils' bridges are tested with the weights.

- Optimize (possibly resolves a new problem): The bridges that have failed are adjusted after a discussion (analysis) and the test. We optimize the bridge until we get the right result.

Question



: which bridge is the longest? Which bridge do you think can carry the most weight? Which bridge do you think is the strongest? Could your bridge carry even more weights? What's your problem? Could you make your bridge even longer / stronger? How can you make your bridge stronger? Can someone help you who does know an answer to the question?

Step 4: looking for explanation

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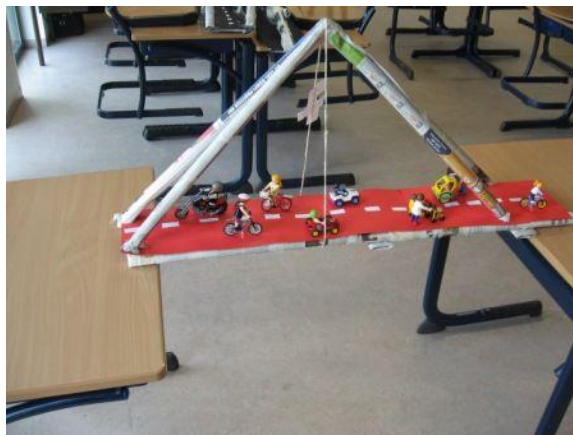
- Post-discussion design (process):

Which bridge is the longest? Which bridge could have the most vehicles? Which bridge can carry the most weight? Which bridge is the most beautiful? Most special? Which bridge has the most color? Which bridge would you like to drive over

- Looking back at the problem:

Has the problem we had been solved

## Results (photos and videos)



## Related links (support materials for the activity: documents, pictures, videos, tutorials, etc.)