Building Bridges

The purpose of this activity is for educators to engage in an engineering experience.

Key Concepts

- Identifying problems
- Planning solutions
- Testing and refining solutions

Materials and Setup

- 10–15 sheets of paper (for example, copy paper)
- Tape
- Chart paper
- 8 oz water bottles (or other heavy item to test the strengths of the bridges)
- Rulers

15 minutes

Small groups

In-person or virtual professional learning

Note: if you are facilitating this activity in a virtual setting, consider the following adaptations:

- Advise participants to come to the virtual session with the necessary materials. You might adjust the materials to better support participant access (for example, instead of measuring with a ruler, participants can measure using a non-standard unit of their choice).
- Use breakout rooms to support collaboration and communication as participants work on their bridges.
- Support participants by explaining a few different ways they might construct their bridge. For example, consider showing participants how to roll their paper into tubes to create pillars.
- Encourage participants to use a shared virtual whiteboard to facilitate planning and documenting.
- Invite participants to build and test their bridge individually. Then, share their designs and documentation in a virtual space such as Padlet.

Activity Instructions

- Form a group of 2–4 people.
- Discuss what you know about bridges. You might use examples from your own experiences.

Constraints and Criteria

Constraints are the limits or requirements a design must work within, such as available materials, time, cost, or safety. Criteria describe what a successful design should do or accomplish, such as how well it works. You will be building a bridge that has the following constraints and criteria:

- Constraints: Build a bridge using only paper and tape. Complete your build within 15 minutes.
- Criteria: Your bridge must be:
  - at least 6 inches high,
  - at least 12 inches long, and
  - strong enough to hold at least two 8 oz water bottles.

Bridges are designed in different ways. Some are long, some are short, some are tall, and some are low. Some bridges can hold heavy items such as cars and trucks. Other bridges hold lighter items such as people. Although bridges can look and function differently, they have the following in common:

- They connect two points.
- They allow things to move beneath them.
- They allow things to move across them.

Today, you will be building a bridge using only paper and tape.

Planning Solutions

Work with your team to plan how you will build your bridge. You might use a sheet of paper or chart paper to document your plans.

- Tell a story about the purpose of your bridge. On a piece of chart paper, document the following:
  - What two points does your bridge connect?
  - What things pass beneath it?
  - What things pass over it?
- Plan how you will design and build your bridge.

Building, Testing, Identifying Problems, and Refining



- Construct your bridge.
- Test your bridge. Does it meet the following criteria?
  - at least 6 inches high
  - at least 12 inches long
  - strong enough to hold at least two 8 oz water bottles
- Notice what problems your bridge has, and explore ways you might refine your design to solve those problems.

Measuring and Documenting

- Measure and document the height, length, and strength of your bridge.
- You might revise your story based on the way your design has changed.

Reflect and Discuss

With your team, discuss the following questions:

- In what ways did you use the engineering and design process?
- What was most challenging about this process?
- What were some of the different feelings you experienced as you worked through the engineering and design process?
- In what ways might children in your setting use engineering skills to explore bridges? Think about children's prior experiences with bridges in their neighborhoods and communities.

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