



Design a Paper Bridge

Background:

Your students have most likely been over a bridge, either by walking, driving, or riding a bicycle. Have they ever wondered if it is difficult to design and build a strong bridge? Challenge them to build a strong bridge out of just paper!

Materials:

- Sheets of paper (either printer paper or construction paper)
- Two books or boxes
- About 30 pennies
- Tape
- Ruler



Procedure:

1. Use the ruler to set up the books/boxes ten inches away from each other. Place a piece of paper on the books/boxes so each edge is on a stack. The paper should fall down under its own weight. If it does not, move the books/boxes farther apart.
2. Discuss bridges with students. Why do we need bridges? Why is it important that bridges be strong?
3. Introduce to students that they will make a bridge strong enough to hold pennies entirely out of paper. Ask students if they think it is possible to do so.
4. Explain to students that their goal is to design a bridge that can hold as many pennies as possible. In order for their bridge to work, the students will either need to roll or fold their paper, but do not tell them this, let them figure it out. They may use up to two pieces of tape to keep the bridge together, but they cannot tape the bridge to the books/boxes.
5. Once the bridge is completed, have students begin to add pennies. Start at one side and add one penny at a time, single file. Once the pennies reach the other side of the bridge, start this process over again by stacking pennies one by one on the base layer. Have students keep track of how many pennies their bridge holds. Continue this until the bridge collapses.
6. After every student has tested their bridge, it is time to ask some questions: How can you make your bridge stronger? Which bridge held the most pennies? Would you change your design at all?
7. If time allows, have students build and test a few more bridges.



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8. Connect this to real life. Civil engineers are tasked to design sturdy bridges that can support a certain amount of weight. It is important that these bridges have a good design because the safety of people depends on it!

Next Generation Science Standards Used:

- **K-2-ETS1-2:** Develop a simple sketch, drawing, or physical model to illustrate how the shape of an object helps it function as needed to solve a given problem.
- **K-2-ETS1-3:** Analyze data from tests of two objects designed to solve the same problem to compare the strengths and weaknesses of how each performs.