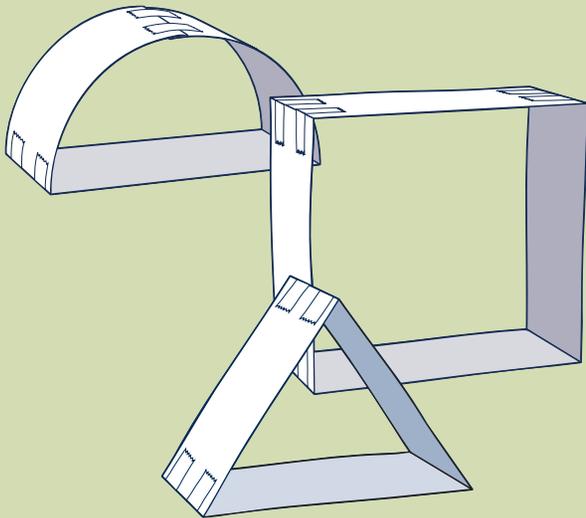


# Canine House of cards

Kids test three common architectural shapes—a square, a triangle, and an arch—to determine which is the strongest. Then they choose one shape and build a two-story structure out of index cards and tape. To pass the building inspection, the structure has to be stable enough to support a jumbo dog biscuit.

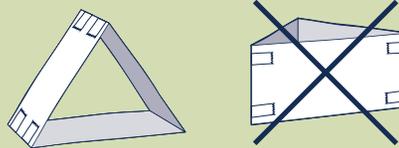
## Prepare Ahead

- Collect images of buildings and bridges that feature arches, triangles, and squares/rectangles. (See suggestions under “Materials.”)
- Assemble several models of index card triangles, arches, and squares, so that groups of 4 or 5 kids can each have a set to examine and test. To form the shapes, see diagram below.



## Lead the Activity

- 1 Introduce Ruff's challenge.** (5 minutes)  
Hand out the activity sheets and explain that today's challenge is to construct a strong building out of tape and index cards, using one of three common architectural shapes—a square, an arch, or a triangle. Tell kids that buildings are made up of a lot of shapes they're familiar with. Show kids the images you collected and ask them to point out triangles, arches, squares, and rectangles.
- 2 Test.** (5 minutes) Display the index-card model shapes you made earlier. Tell kids that some shapes are stronger than others. They should examine the three shapes and choose the strongest one to build with (step 2 on the activity sheet).
- 3 Review the rules** for building listed on the activity sheet. Demonstrate rule #3—shapes must stand upright; they cannot rest on their sides.



## Materials

- Activity sheet for each kid
- 3" x 5" index cards (50 per kid)
- Transparent tape (2 kids can share a roll)
- 2 boxes of large dog biscuits
- Images of architecture from books or the Internet featuring arches (aqueducts, churches, tunnels), triangles (roofs, truss bridges, pyramids), and squares/rectangles (windows, doors)

## National Science Education Standards

**Grades K-4**  
Science and Technology: abilities of technological design

**Grades 5-8**  
Science and Technology: abilities of technological design

**4 Brainstorm.** (5 minutes) Once they've chosen a shape, have kids brainstorm ideas for how they're going to construct the two-story building (step 3 on the activity sheet). Encourage them to keep their goal in mind (a strong building) but also to be creative. Strength is important, but architects and engineers also care about quality, beauty, and how something functions. Remind them to build something Ruff will like!

**5 Build.** (25 minutes) When building, some kids may want to reinforce their structures by building shapes within shapes (e.g., squares within squares, or two arches within a larger arch). As long as they're using just one shape, this is fine. Tell kids that they are building with just one shape because that lets them judge the strength of that shape better. If they used two or more shapes, they wouldn't be able to tell which shape was doing the most work to support the structure.

**6 Evaluate designs.** (5 minutes) When everyone is finished, pass around the dog biscuits around so kids can test their designs. Most buildings will easily hold one biscuit—many kids will want to pile on more.

**7 Discuss what happened.** (10 minutes) Gather as a group and line up the buildings.

- Ask kids how many biscuits their buildings could hold.
- Ask kids how many used triangles. Arches? Squares? *(It's likely that kids used triangles or arches, but not index-card squares, which are extremely unstable.)*
- Then have them talk about their buildings and what they like about their designs.

**8 Award Points.** (5 minutes) Time to rack up some points! Review the activity's key ideas by asking the following questions, worth 50 points each:

- Which shape do you think is the strongest? *(Triangles)* Is there another shape that's also strong? *(Arches)*
- What is the most unstable? *(Squares. They don't hold their shape under pressure.)*
- How did you decide which was the strongest shape? *(We tested them out by putting weight on them and moving them side to side.)*
- How did you make your building strong enough to support a dog biscuit? *(Answers will vary. Encourage kids who made a wide base to talk about how that helped stabilize their building.)*
- Name some structures that use the three shapes we worked with today. *(Triangle: roofs, some bridges. Square/Rectangle: doors, windows. Arches: churches, tunnels, aqueducts.)*

