Tufts UNIVERSITY | Center for Engineering Education and Outreach

Strongest Shape

Suggested Time

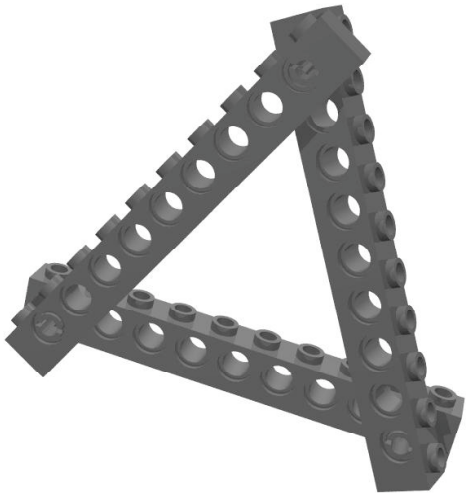
45 - 60 minutes

Age

5 - 10

Challenge

In this activity, investigate different shapes in order to determine which shape is the strongest. Design and construct a number of roofs to be placed on a previously built house. Then test the structures by pushing on the top of the roofs.



Topics

Building, Sturdiness, Familiarity with different LEGO pieces, Geometry

Subjects

Math & Engineering

Related Math & Science Concepts

- Force
- Tension

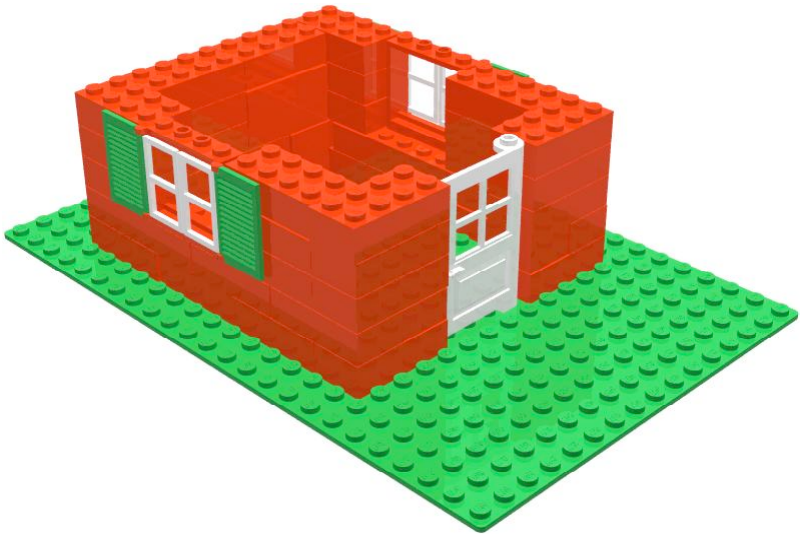
Materials

- Assortment of LEGO pieces
- LEGO beams (as seen above)
- Axles
- Bushings

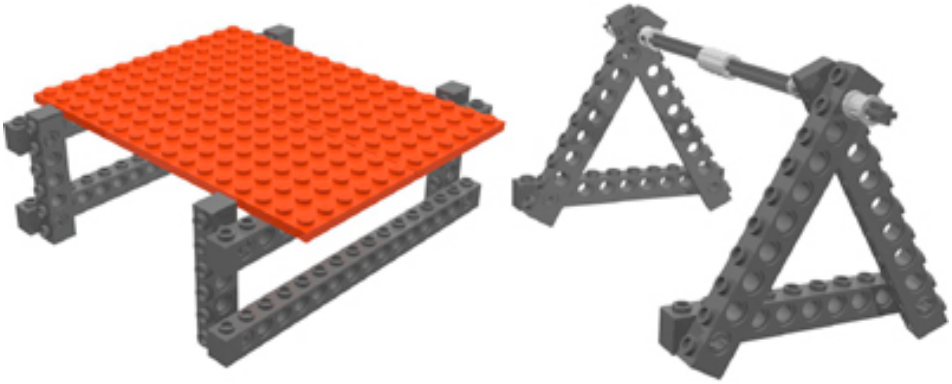
Building Instructions

Programming Instructions

1. Build a roofless house.



2. Design a number of roofs with a variety of shapes fit to the size of the house.



3. Attach the roofs to the house, one at a time.

In Action

Attach each roof and push down to test its strength. If the roof fails the push test, redesign until it passes. From these test trials, the strongest possible shape can be determined.

Related Activities

- Chair for Mr. Bear
- Sturdy Wall
- Sturdy Tower
- Sturdy Car: The Drop Test

Building & Programming References

- Building With Bricks
- Building With Beams
- Building With Plates
- Axle Uses
- Connector Pegs and Bushings

Classroom Management

1. Discuss sturdiness with the students and why certain structures are sturdier than others.
2. Students should build a house without a roof. This activity can be done without this step, but students really enjoy building entire houses.
3. The students should build at least two roofs with different shapes.
4. Test the different roofs by taking turns attaching each to the building and pushing down on the top to test its sturdiness.
5. Spend five minutes at the end of the lesson discussing the sturdiness of each roof shape.