

A VERY FINE HOUSE

BIG IDEA

Students construct their own dream houses!

TIME

30-45 minutes

WHY WE LOVE IT

What your students create will blow your mind! They must consider what a structure needs to be strong, stable, and sustainable.

READY...

Gather materials:

- scrap materials: cardboard, paper or plastic plates or cups, yogurt containers, milk jugs, toilet paper tubes, packing peanuts, plastic bags, wine corks, clean soda bottles or cans, blank or used CDs, lids from drink containers, feathers, cotton balls, foam, etc.
- straws
- duct tape
- hot-glue gun and glue
- aluminum foil
- wood skewers
- Popsicle sticks
- index cards
- planning paper
- pencils
- *Optional for Three Little Pigs:* table fan or hairdryer



SET...

Lay out materials so that everyone can see all of the supplies.

GO!

1. Divide students into groups. Explain the **Big Idea** and any of the challenges described below.
2. Students sketch their house plans in their groups. Don't forget to label the parts!
3. Once the instructor checks the house plans, students can get to work with the materials.

CHALLENGE!

- **Three Little Pigs:** Build a house to keep out the Big Bad Wolf. The BBW (you) tries to "blow down their house" with a fan or hairdryer.
- **Earthquake:** Build a house to withstand an earthquake (you shaking the table).
- **Environmental Champion:** Simulate eco-friendly parts like solar panels or rain barrels. Advanced students can create passive solar heating. Wrap houses with foil, waxed paper, or plastic wrap for windows. What happens when the houses sit next to a window or a lamp? Use a thermometer to see which material absorbs the most heat.
- **History Connection:** Design a sturdy house using only the materials available during a particular historical period. For example, what could the Jamestown settlers use in 1607?

DIFFERENTIATION

- **K-1:** Have small pieces of cardboard and other scrap items prepared in advance.
- **2-3:** Give a little guidance to this group or show them pictures for inspiration.
- **4-5:** Let them go; these students will do a great job building houses for any of the possible challenges.
- **6-8:** Students can write a paragraph imagining the houses they could build with unlimited materials and budget.
How can humans design houses that are more sustainable? How could a house cool or heat itself without needing electricity?

TRY THIS

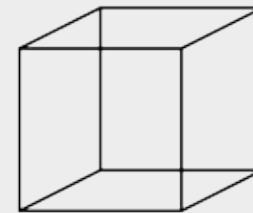
1. Encourage students to go outside for building materials.
2. Leave students' houses outside for a week to see how they fare through the weather.
3. Encourage the group to put their buildings together to create a city or a multi-family residence.
4. Don't stop at structures! Encourage students to build cars, people, trees, etc.



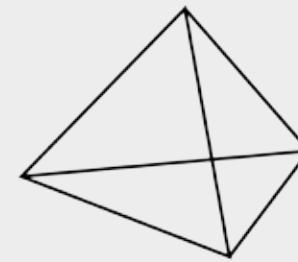
WHY IS THIS SCIENCE?

In building design, structural engineers have to contend with **static strain** and **dynamic strain** on their buildings. Static strain includes everyday loads, such as people and furniture. Dynamic strain is tied to natural, abnormal, and artificial movements. This includes earthquakes and wind.

Most structures, including buildings, are based on **frames**. Some frames are more durable than others. A **square frame** is strong when pressure comes straight down from above. Many square frames put together make a cube. If pressure comes from the side (such as wind from a storm), it tends to be weak and can twist and collapse. A **triangular frame** is much stronger and can better withstand static and dynamic strain. Many man-made structures use this type of shape because it is so durable. Most buildings you see combine both types of frames for support.



Square frames making a cube



Triangular frames making a pyramid

WITH THANKS AND FOR MORE INFORMATION, VISIT:

<http://teachers.cmhouston.org/sites/default/files/three%20little%20pigs.pdf>
http://tpt.vo.llnwd.net/o26/scigirls/activities/House_Warming.pdf

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THE UNIVERSITY
of NORTH CAROLINA
at CHAPEL HILL