

**Think
like an Engineer**
Kindergarten

Egg House Build



Objectives

Identify visual-spatial and problem-solving strengths

Materials

toothpicks
gumdrops
house frame pictures
flexible shapes
toy eggs

Time

30 to 40 minutes

Whole Group Gathered (10 minutes)

Introduce the first 5 vocabulary words, using included craft stick shapes to illustrate the concepts. Show the various polygons and explain that structural engineers use these to build things, from space stations to cars. Demonstrate compression and racking and then ask the students how to prevent racking in the square, pentagon and hexagon. (Cross-braces break down the inside of a polygon into triangles, which is the strongest polygon, since it resists compression and racking.) Show the use of cross-braces.

Show pictures of houses with visible structural detail. Look at roofs and floors and talk about how many sides a room has. Ask about getting in and out of a room, and what engineers do to allow people to enter and exit. Next, explain the materials they will be using, and invite them to create houses that are large enough for an egg to live in. The goal is to make a house that can be picked up without the egg falling out and has a way for the egg to get in and out without dismantling the structure. We have 6 eggs that the group will use to test the houses.

Individual Work (20 minutes)

Give each student a set of 24 toothpicks and 12 gumdrops. Circulate during building time, asking open-ended questions about the design. Reminders about the goal are allowed but remember not to give design tips. Engineers may test with eggs as they work.

Circulate-- test each house by picking it up, taking the egg out, and putting it back in.

Closure ~ (Engineers Stay with Buildings) (5 minutes)

Look at the houses. Which were the most successful, and why? What are some ideas for future attempts? Explain that building design includes many such attempts, including drawing, building scale models and then prototypes, testing, and starting over using what you've learned. Things that don't work are more valuable because we learn more. Great start, Engineers!

Vocabulary~

Structural Engineering ~ a branch of civil engineering dealing primarily with the design and construction of structures (such as bridges and buildings.)

Polygon ~ **n.** a shape that has 3 or more sides

Compression ~ **n.** pressing together, forcing into less space

Racking ~ **n.** The distortion of a rectangular shape to a skewed parallelogram

Cross-brace ~ **n.** crosspiece that transmits, diverts, or resists weight or pressure

Foundation ~ **n.** basis on which something stands or is supported