

## **THE THREE BILLY GOATS GRUFF BRIDGE**



***Who's trip-trapping over that bridge? It's the Three Billy Goats Gruff!***

**Materials:** Book "The Three Billy Goats Gruff" one toy goat and one troll per group DUPLO hula hoops Picture card of bridge types

### **Background Info:**

#### ***What is a bridge?***

A bridge is a structure carrying road, path, railroad, or canal across a river, road, railroad, or other obstacle.

#### ***How does a Bridge support weight?***

A bridge supports weight when the base of the bridge is made out of strong and good material to support the long span. Bridges can hold heavy loads because of the constant pushing and pulling of each part of the bridge. Bridges are subject to two different forces: compression and tension. While some bridges are simple structures, others are strong and built with strong materials. All bridges must be able to support the weight of the material the bridge is made out of as well as the cars on them.

**Intro:** Review rules and process of engineering from last session. Ask students to describe a bridge. What is a bridge? What does a bridge do? Who has been on a bridge? Tell students that bridges can come in many different sizes and shapes. Share the picture card and definitions of the different types of bridges.

**Story:** Explain to the students that today's story has to do with a very famous bridge and an awful troll who lives under it. Read aloud "***The Three Billy Goats Gruff***" and discuss elements of the story, problems in the story, and how the problems were solved.

**Challenge:** Review the different types of bridges again with students. Tell the class that each group will be designing and building a bridge for one of the goats to trip-trap over. The bridge they build must be sturdy enough for the goat to be on. It also must be tall enough in the middle for the Troll to hide under. What kind of bridge will they make? How can they make a sturdy bridge that is both high and long? How will the goat climb onto and off of the bridge?

**Build:** Divide students into work groups. If you like, assign one student to be the "foreman". The foreman will make sure that everyone works together and presents questions to you on behalf of the group. Monitor each group by observing interaction, and asking pertinent questions such as "Can a goat really jump that high to get on the bridge? What other ways to get on the bridge can you make?" Allow students approximately 20 minutes to build.

**Debrief:** Gather the students back together and discuss problems they had and how they solved them. Ask "What worked best?" "What didn't work?" "What did you wish you had to work with?"

**Presentation:** Visit each group's construction. The group presenting are called the "***Sitters***" because they sit and describe what they've done. The teacher and the rest of the class are called the "***Standers***" because they stand around the presenters in a circle to observe and ask questions. The standers and the sitters change depending on the group presenting. Which groups were able to build a bridge that held a goat and allowed a Troll to hide underneath?

