



## Looney Lengths: An Introduction to Legos

**Lesson Objective:** Teach the students about classifying legos by making measurements in non-standard units.

**Concepts:** Counting, Comparing, Measurements (in non-standard units) and Reasoning

**The Challenge:** To cut out the Lego pieces and use measurements to determine where they should be pasted on the Lego Engineering Log.

### **Materials:**

- Lego Mindstorms kit
- Scissors
- Pencils

### **Vocabulary:**

- Brick
- Beam
- Stud
- Length
- Width

**Procedure:** Begin the lesson with these ideas and questions.

- Who has played with Lego blocks before?
- What kinds of things have you built?
- Why do you think we are using Lego blocks in school?

Introduce the two pieces below. Show them to the students and discuss them. What could these pieces be used for? How can they be described?

For the piece to the right: It is called a beam. Beams are long and narrow. The bumps are called studs. What are the studs for? The studs are used to connect Lego pieces like nails in a house. The size of the piece is one “by” eight. Show the students how the piece is one stud wide and eight studs long.



For the piece to the left: It is called a brick. How is a brick different from a beam? It has the same kind of studs as the beam. Bricks are different from beams because they are two studs wide rather than one. What is the size of this brick? This brick is 2 “by” 4.

**Engineering Challenge:** Instruct the students to cut out the Lego bricks and beams on the Lego Engineering Log and to paste them in the correct box on their response sheet. Remind the students that the size is the number of studs wide “by” the number of studs



long. Lengths should never be less than widths. Allow the students to use the actual Lego pieces if they find them helpful for doing measurements.

In the last part of the lesson, show the students how to properly care for, put away and store Lego materials.

**Extensions:**

- Try building a simple structure using beams and bricks
- Draw their structure on a sheet of paper

**Wrap-Up and Sharing:** Bring the students together to discuss the lesson.

- What challenges did you have?
- Are there other ways to measure the sizes of the bricks and blocks? Yes, we could also measure using finger widths, for example. So, a brick might be one finger width by four finger widths. Is there a problem with measuring that way? The biggest problem is that people have many different size finger widths! Would a ruler be a good way to measure size of the bricks? Yes, because all rulers will measure the same size.

**Troubleshooting:**

- Some students will be very familiar with vocabulary and building while others will be inexperienced.
- First grade students are on different levels of math ability and reading comprehension
- If there are no safe children's scissors available consider having the students draw the blocks rather than cut and paste them.
- The bricks and beams in the Lego Dacta set are different from the ones in the Mindstorms kit. There are no beams but here are yellow connectors of various sizes that can be used as substitutes. This means that the teacher or the students will have to create their own worksheets.

**Resources:**

- Lego/Tufts website: [www.ceeo.tufts.edu/curriculum](http://www.ceeo.tufts.edu/curriculum)
- Lego Dacta "Simple and Motorized Machines" Teacher Guide

**Credits:** The Lego Engineering Log is based on one developed by Tufts University Center for Engineering Educational Outreach.



### Lego Engineering Log

Engineer: \_\_\_\_\_ Date: \_\_\_\_\_

Cut out the bricks and beams. Paste them in the box with their type and size.

Beam – 1 by 4	Brick – 2 by 2
Beam – 1 by 6	Brick – 2 by 4
Beam – 1 by 8	Brick – 2 by 6
Beam – 1 by 16	Brick – 2 by 8

