

**Lesson 3: Testing the Tension**

A tensile test (or tension test) assesses a material's strength by pulling on the material until it breaks. While the material is undergoing the tensile test, the amount it stretches and the amount of force required for the material to break indicates the strength of the material. Are you ready to stretch some metals? Use the Tensile-o-Matic and test the bridge materials!

Doing the Science

1. Start the Bridge Metal Simulation by clicking on the "Sim" tab.
2. Click on the "Tensile Center" button.
3. Click the "New Sample" icon and choose "Sample #1."
4. Record the 10-digit sample code beside the Sample # in Table 1 below.
5. Click on the red lever labeled "Tension" to start the machine.
6. When the metal breaks, record the force given by the machine in Table 1 below. You may reset the test by clicking on the red lever labeled "Reset".
7. Click on "New Sample" and repeat steps 4-7 for all seven samples.
8. Based on the force that broke the metal, rank the metals based on strength (1 being the strongest and 7 being the weakest) and record them into Table 1.

Table 1.

Sample #	10-Digit Sample Code	Force of Tension	Ranking
1			
2			
3			
4			
5			
6			
7			

Do You Understand?

1. Why are there so many different types of strength tests?
2. Would a tensile test or compressive test be better for testing bridge materials? Explain. (A compressive test has forces that push inwards to flatten. A tensile test has forces that pull the material outwards to stretch.)