Name\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Period \_\_\_\_\_\_\_\_\_\_\_\_\_ Date \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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**Lesson 4: Gear Up For Shear**

Shear testing assesses the shear strength of a material before it breaks. The thought of a metal girder on a bridge shearing off and leading to a total structural failure and a collapse of the bridge is sheer terror. Cheer for shear as you put the Shear-Matic 2012 to the test.

**Doing the Science**

1. Start the Bridge Metal Simulation by clicking on the “Sim” tab.

2. Click on the “Shear 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 “Shear” to start the machine.

6. When the metal breaks, record the shear 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 in Table 1.

**Table 1.**

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

**Do You Understand?**

1. Which metal did you expect to perform the best? Did it? Why do you think this is so?

2. Is there a relationship between the shear and tension forces? Explain.