Visit the Building Big website at http://www.pbs.org/wgbh/buildingbig/ OR
go to the Physics page of the Kid Zone at http://sciencespot.net/ to find the link.

Section A: Choose Interactive Labs from the main menu.

1. Draw a line to match each FORCE to its best description.
   - Compression • A force that stretches a material apart usually causing it to become longer.
   - Tension • A force that squeezes a material together usually causing it to become shorter.
   - Bending • A force that causes parts of a material to slide past one another in opposite directions.
   - Shear • A force that causes a straight material to curve as one side squeezes and the other side stretches apart.
   - Torsion • An action or force that twists a material.

2. Visit the LOADS section to explore the effect of external forces on the strength of a structure.

<table>
<thead>
<tr>
<th>External Force</th>
<th>Description of Problem</th>
<th>How To Strengthen It</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weight of Objects</td>
<td></td>
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<tr>
<td>Soft Soil</td>
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<tr>
<td>Temperature</td>
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<td>Earthquake</td>
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<tr>
<td>Wind</td>
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<tr>
<td>Vibration</td>
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</tbody>
</table>

3. Investigate three different types of MATERIALS. Write a description of each that summarizes its strengths, weaknesses, and at least one application or use.

<table>
<thead>
<tr>
<th>Material</th>
<th>Strengths</th>
<th>Weaknesses</th>
<th>Applications (Uses)</th>
</tr>
</thead>
<tbody>
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</table>
4. Explore the **SHAPES** section to learn more about how forces affect them.

(a) Click the rectangle.
What happens when you push it? ____________________________________________________________
How can you strengthen it? __________________________________________________________________

(b) Click the arrow for the next shape.
What happens when you push down on the arch? ______________________________________________
How can you strengthen it? __________________________________________________________________

(c) Click the arrow for the next shape.
What happens when you push on one side of the triangle? _________________________________________
How can you strengthen it? __________________________________________________________________

(d) Click the “Compare Strength” button. Use the slider to add weight to each shape. What do you observe? Write a paragraph to summarize your observations.

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**Part B: The Challenges** - Return to the main menu on the home page to find the link!
Choose the **SKYSCRAPER CHALLENGE** and read the information before proceeding to Location #1.

5. What material would be the best choice for the building at Location #1? What is the best method for bracing the building to prevent damage from winds?

   Material - _____________________________________________________________________________
   Bracing - _____________________________________________________________________________

6. What was the best option for dealing with the soil conditions under the building at Location #2?

   Option - _____________________________________________________________________________
   Bracing - _____________________________________________________________________________

7. Which structural design would work the best for the building at Location #3? What type of bracing would be the best to prevent damage from earthquakes?

   Option - _____________________________________________________________________________
   Bracing - _____________________________________________________________________________

**Done?** Explore other areas of the **Building Big website**, try one of the challenges at the **Junkyard Wars** website at http://school.discovery.com/networks/junkyardwars/fun.html, or visit any of the other sites listed on the **Physics page** of the **Kid Zone**!