Bridge Building WebQuest

BOTH STUDENTS MUST HAND IN THEIR OWN WEBQUEST


1. Compression is:

2. Tension is:

3. Buckling is:

4. Snapping is:

5. To dissipate a force is to:

6. To transfer a force is to:

The Beam Bridge

7. Draw a picture of a simple beam bridge. Show where they have compression and tension forces.

8. How does a truss help a bridge beam?
9. Why is a beam bridge limited in the distance it can span?

10. What shape is always found in a truss, regardless of the type? ______________________________

The Arch Bridge

11. Draw a picture of an arch bridge. Show where they have compression and tension forces.

12. Why is an arch bridge limited in the distance it can span?

The Suspension Bridge

13. Draw a picture of a suspension bridge. Show where they have compression and tension forces.

14. How is a cable-stayed bridge different from the traditional suspension bridge?

Additional Bridge Forces

15. Torsion is:

16. Resonance is:
The Beam Type
1. What are beam bridges commonly built from? ______________________________

2. Describe how modern steel beam bridges are constructed.

Arch Type
3. What are arch bridges commonly built from? ______________________________

4. Describe how steel arch bridges are constructed.

Suspension Bridges
5. Describe how a floating tower is made.

6. Describe how cables are placed onto the bridge.

Cantilever Bridges
7. What is a counterbalance?
Materials - Concrete

8. List the five the structural problems of concrete.

Tips for Building - [http://civil.camosun.bc.ca/spaghetti_bridge/Tips.htm](http://civil.camosun.bc.ca/spaghetti_bridge/Tips.htm)

1. Which triangle is more stable? (Circle one)

2. Is spaghetti better used in tension or compression? ______________________________

3. Should compression members be shorter or longer than tension member? ______________________________

PBS: Forces Lab - [http://www.pbs.org/wgbh/buildingbig/lab/forces.html](http://www.pbs.org/wgbh/buildingbig/lab/forces.html)

Forces

1. What is a real life example of “squeezing” or compression?

2. What is a real life example of “stretching” or tension?

3. What is a real life example of bending?

4. What is a real life example of “sliding” or shear?

5. What is a real life example of “twisting” or torsion?
**Loads**

6. Adding a thick beam to the structure allows it to hold more load. What is a drawback of adding this thick beam?

**Materials**

What are the pros and cons for each of the following building materials?

<table>
<thead>
<tr>
<th>Material</th>
<th>Pros</th>
<th>Cons</th>
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<tbody>
<tr>
<td>7. Wood</td>
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<tr>
<td>8. Plastic</td>
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<td>9. Aluminum</td>
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<td>10. Brick</td>
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<tr>
<td>11. Concrete</td>
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<tr>
<td>12. Reinforced Concrete</td>
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<td>13. Cast Iron</td>
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<tr>
<td>14. Steel</td>
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</tbody>
</table>

**Shapes** (Draw a picture if it helps)

15. What happens when you push the side of a rectangle?

16. How can you strengthen it?

17. What happens when you push down on an arch?
18. How can you strengthen it?

19. What happens when you push the side of a triangle?

20. Where is the strongest point of a triangle?

**PBS: Build a Bridge** - [http://www.pbs.org/wgbh/nova/bridge/build.html](http://www.pbs.org/wgbh/nova/bridge/build.html)

Complete Steps 1, 2, and 3.

Which of the follow bridges would be most appropriate for each location: arch bridge, beam bridge, suspension bridge, or cable-stayed bridge?

1. A 5,000-foot span across an ocean bay where huge ships come and go.

2. A 120-foot span across a freeway.

3. A 1,000-foot span across a river busy with barge traffic.

4. A 700-foot span across a deep canyon gorge.


Engineering for Earthquakes

1. Play the game and determine a bridge combination with NO safety features that will allow it to survive an earthquake from the Hayward fault with a magnitude of 6.0

2. Play the game and determine a bridge combination along with safety features that will allow it to survive an earthquake from the San Andreas fault with a magnitude of 7.5

**Just For Fun! FWG Bridge** - [http://www.physicsgames.net/game/FWG_Bridge.html](http://www.physicsgames.net/game/FWG_Bridge.html)

Try to beat the game!