

## Building Big Challenge

Name(s) \_\_\_\_\_

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.

External Force	Description of Problem	How To Strengthen It
Weight of Objects		
Soft Soil		
Temperature		
Earthquake		
Wind		
Vibration		

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

Material	Strengths	Weaknesses	Applications (Uses)

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.

**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!**