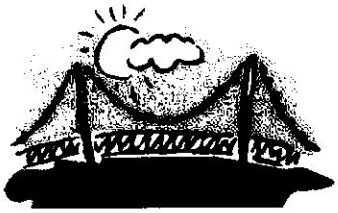
KEY

Building Bridges

Go to:

http://www.pbs.org/wgbh/buildingbig/lab/forces.html

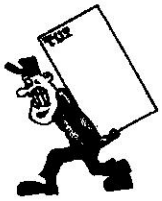


Complete the Forces, Load, Materials, and Shapes Labs.

Answer the questions below for each one.

FORCES:

1. Compression is the force that squeezes a material together.
2. Tension is the force that stretches a material apart.
3. Bending is the action when a straight material becomes curved. One side is compressed and the other is stretched.
4. Shear is the force that causes parts of a material to slide past one another in opposite directions.
5. Torsion is an action that twists a material.



LOADS:

1. Forces that act on structures are called loads.
2. The weight of the structure itself is called the dead load. It includes columns, beams, and nuts / bolts.
3. The weight of the stuff on the structure is called the live load. It includes people or vehicles.
4. Other loads that can affect a structure include wind loads, temperature (thermal loads) earthquakes settlement loads.

MATERIALS:

1. Which materials cost the most? Aluminum & Plastic
2. Which material weighs the least? wood

SHAPES:

1. The shape of a structure affects how strong it is.
2. Three common shapes used in structures are rectangles, arches, and triangles.
3. You can use a diagonal to strengthen a rectangle.
4. Draw a picture and label how you can strengthen an arc.

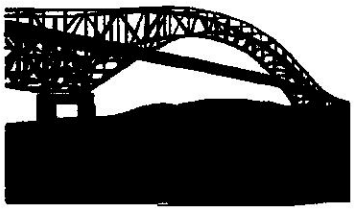
5. What is the weakest part of a triangle? its sides

http://www.pbs.org/wgbh/buildingbig/bridge/

Complete the Bridge Challenge:

KEY

Bridges



Across
4. A structural frame in a bridge or A-line roof.
6. Shape often used in bridge design to help distribute forces in different directions.
8. Bridges must be able to support loads and the _____ of the bridge itself.
9. Type of bridge that uses steel cables as part of its structure.

Down
1. Bridges are a vital part of our transportation _____.
2. In addition to supporting load requirements, you must also consider this in your bridge design.
3. When forces acting on a bridge member are pushing in toward one another.
4. When forces acting on a bridge member are pulling away from each other.
5. Type of bridge that utilizes rounded curves in its design.
7. The force the bridge must support that includes the weight of people or vehicles that use the bridge.