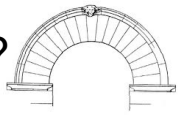
What's the **Big** Idea?



What You Should Know and Do: "...demonstrate an understanding of the relationship between the effectiveness of structural forms and the forces that act on and within them".

Design Challenge "Why Do Things Fall Down?" "Why Don't Things Fall Down? Part II"

In our last activity, we learned that a a force is any push or pull on a structure. Every structure must be designed and built to withstand the forces it will face. An unstable structure may be damaged and become unsafe! To build better structures, we need to know the forces that will act upon them. There are two forces at work:

- ☑ **External Forces** are forces that come from outside a structure.
- ☑ **Internal Forces** are forces that one part of a structure puts on another part of the same structure. They come from inside the structure.

Describing Forces!
When we describe how forces act on structures, we need to ask 3 questions:

1. How strong are forces?
2. From which direction does it come from?
3. Where does it meet the structure?

Apply the above using the objects below:

- tree, kite, campfire, tent, elephant, bike, car, plane, Mr. Sarkar

Did you know?
Playground equipment have to undergo major testing before being set-up? Why?

Your Challenge: (Materials: popsicle sticks, glue, assorted construction paper)

1. Design a structure using the materials provided that will be able to withstand a simulated natural disaster.

Your steps:

1. There's plenty of web sites out there with directions on HOW to build a structure, however your first step is to develop a PLAN on what type of structure you wish to build?

__tower __bridge __lodging __other?: _____

2. What makes a structure stable? This is really important! Check out the vocabulary list below. Do you know what they mean?

- ☐ static load
- ☐ dead load
- ☐ live load
- ☐ foresight
- ☐ the load
- ☐ Stable
- ☐ centre of gravity
- ☐ concentrated
- ☐ structure
- ☐ foundation
- ☐ undamaged
- ☐ supported
- ☐ Campanile
- ☐ Foundation
- ☐ Stabilize
- ☐ Lean distance
- ☐ tapering
- ☐ topple

- ☐ stability
- ☐ low centre of gravity
- ☐ gravitional force
- ☐ form follows function
- ☐ arch bridge
- ☐ cable stay bridge
- ☐ girder
- ☐ pier
- ☐ span
- ☐ suspension
- ☐ truss
- ☐ frame structure
- ☐ abutment
- ☐ buckle
- ☐ bend
- ☐ compression

- ☐ corrugation
- ☐ dead load
- ☐ dynamic load
- ☐ live load

Need a place to start?

http://www.wikihow.com/Build-a-Popsicle-Stick-Tower

http://www.instructables.com/id/Popsicle-Stick-Bridge/

http://www.howcast.com/videos/391362-How-to-Build-Bridges-with-Popsicle-Sticks