

Grade 7 Science Structures **Structural Failure and Testing**

Name: _____ Class: _____ Date: _____

We have all heard of how some buildings fall down and how violent storms destroy some buildings.

Why does this happen?

It all has to do with forces (dynamic) and structural strength. Structures are designed to withstand certain loads or forces. But sometimes the structures are not designed correctly or the loads too much. Designers can engineer a structure to be very sturdy but that increases costs so it is always a balance between cost, beauty and safety.

When structures fail, scientists like engineers analyze what happened to learn more from what happened. They then share this information so that the information is used to make structures more safe in the future.

Your task is to look up information on a structural 'disaster'.

Here are a couple of famous examples:

Leaning Tower of Pisa (Pisa, Italy)
Quebec Bridge Collaspe (Quebec City, Canada)
Sampoong Dewpartment Store Collapse (S. Korea)
Lotus Riverside Compound (Shanghai, China)
Three High-Rise Office Buildings (Rio, Brazil)
Hyatt Regency walkway collapse (Kansas City, USA)
Savar Building (Dhaka, Bangladesh)
Ronan Point (London, England)
Royal Plaza Hotel (Nakhin Ratchasima, Thailand)
World Trade Center Twin Towers (New York City, USA)

For your miniresearch, find the following

Title of Disaster:

Year of disaster:

What happened?:

What forces caused the failure:

Sometimes there are controlled demolitions of buildings or other structures. Sometimes they go as planned and sometimes they do not.

Look up some videos of controlled demolitions. Here is a link to a pretty good collection:

<https://youtu.be/Mb4MNe1vk70>

What did you notice about the controlled demolitions?

The last part of this worksheet discusses how we use tests to make sure that the strength of materials are sufficient to withstand the load of the building or structure being designed and also the dynamic loads that will influence them. Thinking back to the video we watched on the Burj Khalifa, what were some of the tests done on different parts of the building as it was being designed and built? Try to describe 2 or three of them.

Do a search on what a 100-year event or a 1000-year event is?

Why do design engineers have to account for this type of event (rain, snow, earthquake, hurricane, etc)?

Why are these events happening more and more (think of global climate change)?