Building and Bridges Project

A. Complete the Web Quest using the link below.

http://www.google.ca/url?sa=t&rct=j&q=&esrc=s&frm=1&source=web&cd=2&ved=0CDsQFjAB&url=http%3A%2F%2Fteacherweb.com%2FWQ%2FMiddleSchool%2FBridges%2Fapt3.aspx&ei=pJplUZngIYaUjAKIn4HQCw&usg=AFQjCNFhKUA1SEEkYEU4K9I1cpR926P44Q&sig2=eGrtNngvtQrGCCWc8k-pAw

Complete B OR C Below or do 1 structure from each section.

You may choose how to present your material.

B. Bridges

Pick 2 famous bridges in the world

Tell why you picked each bridge

Describe and draw the bridges

Record 8 stats related to the structure

Give the history of the bridges

Discuss the structures involved

Include a 4 pictures and caption of your bridge

Create a Venn diagram to compare and contrast your bridges

C. Building

Pick 2 famous man-made structures in the world

Tell why you picked each building

Describe and draw the buildings

Record 8 stats related to the structure

Give the history of the buildings

Include a 4 picture and caption of your bridge

Create a Venn diagram to compare and contrast your buildings

D. **Model**

Create a model of one of your buildings or bridges. Use the design process sheet and test your model using various loads. Record your observation and improvements for your design.

Bridges Web Quest

Follow the directions step-by-step. You will be visiting different web pages and filling out your information page as you go (25 homework points!)

1. Find out about the forces that affect bridges. Visit http://www.pbs.org/wgbh/buildingbig/lab/forces.html and use the interactive lab to define each of the following forces in your own words and to describe a real-life example:

a. **compression**
b. **tension**
c. **bending**
d. **shear**
e. **torsion**

f. Go to the website http://www.5min.com/Video/The-Original-Tacoma-Narrows-Bridge-Collapse-of-1940-119995718 to watch a famous video of the doomed Tacoma Bridge, built in 1940 in the state Washington. Which type of force destroyed the bridge?

2. Find out about the load. Visit the Loads Lab: http://www.pbs.org/wgbh/buildingbig/lab/loads.html and use the interactive activity to answer the following questions:

a. What is the **dead load** of a bridge?
b. What is the **live load** of a bridge?
c. What is **settlement** and how can it affect a bridge?
d. What is **thermal load** and how can it affect a bridge?
e. What is **earthquake load**?
f. What kind of load is caused by the wind?
g. What is a **dynamic load** and what causes it?

3. Use the information at http://www.wsdot.wa.gov/projects/sr24/i82tokeysrd/bridgeglossary.htm to define the following parts of a bridge and then label the simple beam bridge on your worksheet.

a. **span**
b. **column**
c. **deck**

4a. There are three main types of bridges. Go to page http://science.howstuffworks.com/engineering/civil/bridge1.htm to write a definition for each type, and sketch a simple example of each.

b. Go to http://www.pbs.org/wgbh/nova/bridge/meetcable.html and record information about a fourth type of bridge, the cable-stayed bridge.

5. Go to the Materials Lab at http://www.pbs.org/wgbh/buildingbig/lab/materials.html and fill in the table to compare and contrast the strength, cost and weight of wood, concrete, reinforced concrete, cast iron, and steel. Test each material and record your observations in the table. Use the tabs to examine the properties, pros and cons, and applications of each type of building material.

6a. Go to the Shapes Lab at http://www.pbs.org/wgbh/buildingbig/lab/shapes.html and test each shape to find out about its strength. Click on each shape to learn how it responds to force. Then use the slider on the right side of the screen to add weight to each shape. Record in the table how much weight it takes for each shape to collapse.

6b. A **truss** is made up of a set of interconnected triangular shapes. Trusses are used in building all kinds of structures. Trusses are incredibly strong, and there are many different arrangements. Visit http://www.geocities.com/baja/8205/truss.htm and sketch an example of each of the truss designs listed (you can just sketch the simplest version of each).
i. Simple Truss (see http://messiahbridgeworks.com/general_info.html)
ii. Pratt Truss
iii. Whipple Truss
iv. Warren Truss

7. Optional Extra Credit: (But this is fun!) Go to http://www.physicsgames.net/game/Cargo_Bridge.html. Use the wood connectors and wood walk to design a bridge that will safely span the gap and will hold the load. Keep trying until you win the game!

Sketch your successful bridge design and describe what happened when you tested it.