**EVALUATION OF A DESIGN OF A BIKE (7-3-11)**

We have completed an identification of the structural features that make a bike FUNCTIONAL . We learned that for a bike, some of the main design features include:

A bike has many more INTERNAL FORCES exerted upon it. EXTERNAL forces are dead load (the bike itself) and live load (the person on the bike).

A bike’s function is to hold a person’s mass (external force) so it has rigid shapes that are strong.

Strength comes from mostly from triangles because they spread out the force of gravity that pulls down on the person in more than 1 direction. It also has gussets on the spokes to resist compression forces (internal force).

It’s stability comes from a low center of gravity (it is a stunt bike and not a speed bike).

Joints – like elbows or shoulders these fasten parts of the frame together. Some joints on the bike allow movement so we call them mobile joints. Some joints do not allow movement so we call them rigid joints.

There are some signs of structural stress/fatigue/failure on the bike. They are \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**EVALUATION OF A DESIGN (7-3-11)**

Evaluate one of the following structures. Include at least 5 of the following

1. Identify what internal forces (tension, compression, torsion, shear) act upon it
2. What gives it its strength (corrugation, lamination, triangles, struts, curves). Think of the FUNCTION of the structure (ie is it meant to support, transport, contain (hold), shelter, lift, separate, fasten, break, hold or support some forces?)
3. Why it is made of the materials it is made of? Again, think of the function and why it would be good at that function.
4. What gives it stability (centre of gravity, support base, tapering)
5. Any signs of structural stress? Structural fatigue? structural failure?
6. One improvement to the structure. The improvement could relate to

\*alleviating the internal forces you identified in a)

\*alleviating the external forces you identified in b)

\*an alternate material

\*an alternate way of joining the parts

**Structures to Choose from:**

1. 7-11 structure (see photo)
2. Pembina & Bairdmore clock (see photo)
3. Beam Bridge (ie railway bridge)
4. Truss (Framed) Bridge Ex: Champlain Bridge, Montreal, Quebec
5. Arch Bridge Ex: Rainbow Bridge, Niagara Falls, Ontario
6. Suspension Bridge Ex: Ambassador Bridge, Windsor,
7. Cantilever Bridge Ex: Quebec Railway Bridge, Quebec
8. Other

|  |  |  |
| --- | --- | --- |
| 7-3-11  | Evaluate a structure to determine the appropriateness of its design, using the design process. *Examples: jacket, foot stool, local building*  | GLO: C3, C4, C8, D4  |