DESIGNING A LOAD-BEARING STRUCTURE

Group Names: _____ Bridge Name:_____
Class Number: _____

The objective of this assignment is to apply the knowledge gained during the Structure and Forces science unit to build a load-bearing bridge out of simple materials.(Learning outcomes for this activity: K 1.2, K 1.5, K 2.1, K 2.3, S 2.1, S 3.3, S 4.1, S 4.2)

Problem:
You have been hired by the company, "Bridges R Us" to build a bridge with a span of at least 20cm, which will support a load of 1000g.

Materials
Spaghetti, marshmallows, tape, paper, rulers.

Rules:

- The bridge must be built from spaghetti, marshmallows, tape, and a single piece of paper to create a flat surface for the load (round weights) to roll on.
- The bridge must span two level surfaces, which are 20 cm apart.
- The bridge must be at lest 5cm wide for the entire length
- The bridge must be free-standing

Procedure: Checklist.

- Decide on what type of bridge you would like to build. You may choose from the following list: suspension bridge, simple beam, truss beam, arch, or a hybrid (mixture) of the four types.
- Use the textbook (pg. 290, 291, 301-303), notes, books, Internet etc. to research about the bridge that you choose to design.
- Draw a detailed design (checklist on design worksheet) of your bridge using pencil and ruler to be initialed by the teacher.
- Build your bridge according to your design using spaghetti, marshmallows, and tape.
- Complete Oral Presentation Plan.
- Hand in your bridge with names.
- Present your bridge design to the class
- Test strength for final mark using masses (200g, 500g, 700g, 1000g) rolled from one end of bridge to the other.

Spaghetti Bridge Marking Guide

Group Members:_____ Class:_____

Aesthetics

4 The structure of the bridge is symmetric.
3 The structure of the bridge is mostly symmetric.
2 The structure of the bridge is somewhat symmetric.
1 The structure of the bridge is not symmetric.

Criteria

__ Car (weights) can drive over bridge (5 cm width)
__ 20 cm span
__ free standing
__ made of spaghetti, marshmallows, and tape only

4 Bridge meets all four criteria.
3 Bridge meets three of the four criteria.
2 Bridge meets two of the four criteria.
1 Bridge meets only one of the four criteria.

Innovation

4 The design of the bridge is complex, creative and difficult (eg. suspension, truss).
3 The design of the bridge is somewhat creative and difficult.
2 The design of the bridge has limited complexity.
1 The design is very basic (eg. a basic beam bridge).

Oral Presentation

4 Makes an engaging presentation that provides a comprehensive explanation of the design and the forces acting on the structure.
3 Makes an interesting presentation that provides a complete and logical explanation of the design and the forces acting on the structure.
2 Makes an superficial presentation that provides a reasonable explanation of the design and the forces acting on the structure
1 Makes an simplistic presentation that provides a vague explanation of the design and the forces acting on the structure

Load

4 The bridge can support a 1000 g load.
3 The bridge can support a 700 g load.
2 The bridge can support a 500 g load.
1 The bridge can support a 200 g load.

TOTAL /20