

Physics: Pasta Bridge Project

Objective: To research and understand the physics behind structures (buildings, bridges, etc.)

To design and build a working bridge out of uncooked pasta and glue.

To learn good and bad elements from a test model (trial and error).

(You will use your understanding of Force, Gravity, Tension, Force Components, etc.)

Rules for your “Test” Model:

- 1) The bridge must span a gap of 30 cm.
- 2) The Test Bridge will be broken in class for everyone to learn from.

Rules of “Actual” Bridge Construction:

- 3) The bridge must span a gap of 40cm. Make your bridge longer than that.
- 4) The width should be less than 20 cm, and **no taller** than 20 cm in height.
- 5) The TOTAL weight of the complete bridge must be **550 grams** or less.
- 6) Any uncooked pasta may be used, except for...
- 7) No specialty “Long Tube” pasta may be used. (Ask for clarification)
- 8) Regular glue or Hot glue only. NO EPOXY or “BONDO” types
- * **Be Extremely Careful With Hot Glue ... It Can Cause Serious Injury !!!**
- 9) There must be a road for a “match-box car” to go through!!!

Project Folder (to be turned in with bridge)

- 1) Use a folder, NOT a three ring binder.
- 2) Ideas, rough drawings, sketches, etc. **Keep All Of It!**
- 3) After breaking your Test Bridge, explain the following:
(**This part is most important part of the folder**)
 - A) Where did the structure fail? (Show with visual sketch)
 - B) Why do you think it failed? (List and be specific on sketch)
 - C) What did you learn from other students’ Test Bridges? (Show with sketches)
- 4) Photograph or Neat Drawing of your TEST *and* FINAL bridge.
- 5) Label Sections: 1) Ideas/Sketches 2) After Test Bridge 3) Final Pictures

Strength Test:

A strap will be placed on the middle of the bridge length-wise. Where the strap is placed on the bridge is up to you.

A bucket underneath will hold the weights until the bucket hits the ground.

Bridge Breaking Day :

- 1) Bring in your completed Bridge and Folder.
- 2) The bridge’s weight will be measured for final approval on the official scale.
- 3) **Make sure that the first page of your folder is the Project Grade Sheet**

Grading:

Completion of your Test Bridge that meets all requirements is: 6 pts. Possible
(Zero pts if not completed, Half pts if not testable)

Completion of your Project Folder is: 6 pts. Possible

Creativity of design of your Final Bridge is: 3 pts. Possible
(Zero to Half pts if copy/unoriginal/pyramid/etc)

You will receive 6pts for reaching 9 kg (20 pounds) 6 pts. Possible

You will receive 1 pt for each additional
4.5 kg (10 pounds) after initial 9kg (up to 18 kilograms extra) 4 pts. Possible

TOTAL POINTS POSSIBLE: 25 pts

Bridge Project Grade Sheet

USE THIS SHEET AS THE FIRST PAGE IN YOUR FOLDER.

Project Folder Grading:

-Rough Sketches/Ideas _____ out of 1
-Test Bridge Sketch of Failure
& Explanation of Failure on Sketch _____ out of 2
-Learned from other Bridges? _____ out of 1
-Picture/Sketch of Test Bridge _____ out of 1
-Picture Sketch of Final Bridge _____ out of 1

Folder TOTAL _____ **out of 6**

GRADING:

Test Bridge Completed: _____ **out of 6 points**

Creativity/Originality of Design: _____ **out of 3 points**

Strength Grade (Reached 9kg): _____ **out of 6 points**

Total kgs held: _____ (1 pt/4.5 extra kg): _____ **out of 4 points** (max: 18 kg)

Penalties: _____ **minus points**

BONUS: _____ **plus points**

Penalty Scale:

Bridge Weight: **BEING OVERWEIGHT** (0 to 55 grams) **-1 pts**, (56g to 110g) **-2 pts**, (over 110 g) **-3 pts**
Bridge Height: **BEING TOO TALL** (0 to 1 cm) **-1 pts**, (1 to 2 cm) **-2 pts**, (over 2 cm) **-3 pts**
Bridge Length: **NOT LONG ENOUGH** (0 to 2 cm) **-2 pts**, (over 2cm) **-3 pts**
Bridge Road: **ROAD?** (not drivable) **-1 pts**, (no road at all) **-2 pts**

TOTAL GRADE: _____ **out of 25 points**

***** CUT HERE / TURN IN BELOW IF NOT SAME PTS *****

Multiply the TOTAL GRADE FOR GROUP by the number of group members. This is now your **NEW TOTAL**. Divide the **NEW TOTAL** points among your group members.

(One person cannot have more than 26 pts)

Class Period: _____

Name: _____ Pts: _____ out of 25

Name: _____ Pts: _____ out of 25

Name: _____ Pts: _____ out of 25