

SPAGHETTI BRIDGE PROJECT 2020

Google Classroom Code: **25zcywv**



Spaghetti Bridge Video



OBJECTIVES

Students will:

- Build and test model bridges to the breaking point
- Apply math, science, and computer technology as problem-solving tools
- Learn how real bridges are designed and built
- Maintain a Bridge Portfolio.

PART I – HISTORY OF BRIDGE BUILDING

- Three prepared *questions* for Dr. Tan's lecture on Thursday January 30th spanning all of LB1 and LB2 in the library about types of bridges and/or building materials.
- Due by 11:59 PM on January 28th in Classroom
- Each student submits a Google form.
- (3 pts)

PART I – HISTORY OF BRIDGE BUILDING

- Educational Video: “Building Big: Bridges”
worksheet
- **Due March 4th in the Bridge Portfolio.**
- Each student submits one.
- **(10 pts)**

PART I – HISTORY OF BRIDGE BUILDING

- Bridge WebQuest, online research activity *worksheet* to investigate bridge types, bridge terminology, and bridge construction factors
- **Due March 4th in the Bridge Portfolio.**
- Each student submits one
(20 pts)

Overview of Part 1 Paperwork

- Questions for Dr. Tan by 11:59 on January 28th
- Video worksheet on Building Bridges March 4th
- Webquest on Bridges March 4th

PART I – HISTORY OF BRIDGE BUILDING

PHOTOS OF BRIDGES

- Take a *photo* of each type of the following bridges:
 - o a beam bridge
 - o an arch bridge
 - o a suspension bridge.
 - o You or your partner must be in the picture
 - o Uploaded to Classroom, using the Google form.
 - o To be turned in on March 4th as part of the Bridge Portfolio

PART I – HISTORY OF BRIDGE BUILDING

PHOTOS OF BRIDGES

Each photo is worth 4 pts **(12 pts)**

- o 1 pt for having a picture of a bridge
- o 2 pts for accurately labeling the type of bridge
- o 1 pt for being in the picture.

PART II – BRIDGE BUILDING Scale Drawing

- Create a **scaled *drawing*** of your bridge on 8 ½ x 11 piece of paper.
 - o Side and top view
 - o Bridge height and span must be labeled
 - o To be turned in on March 4th as part of the Bridge Portfolio

PART II – BRIDGE BUILDING Scale Drawing

- 5 pts for accuracy of the drawing
- 5 pts for having a scale
- 5 pts for using the scale correctly
- 5 pts for general neatness.

(20 pts)

PART II – BRIDGE BUILDING Scale Drawing

- Take a *photo* of your bridge DURING (not at the end) the construction process.
- Photo must be uploaded to the appropriate assignment on Spaghetti Bridge Project Classroom.
- Due by March 4th **(5 pts)**

PART II – BRIDGE BUILDING Completion & Failure

- *Turn in your bridge on March 4th*
- *Evaluate* the remains of your bridge **AFTER TESTING ON MARCH 6TH** and take a photo of the "failure point" of your bridge
- Upload photo to Classroom.
- Complete your evaluation in the form in Classroom
- **Due by March 9th (after your bridges were tested on day 6 on March 6th)**
- **(10 pts)**

PART II – BRIDGE BUILDING Failure

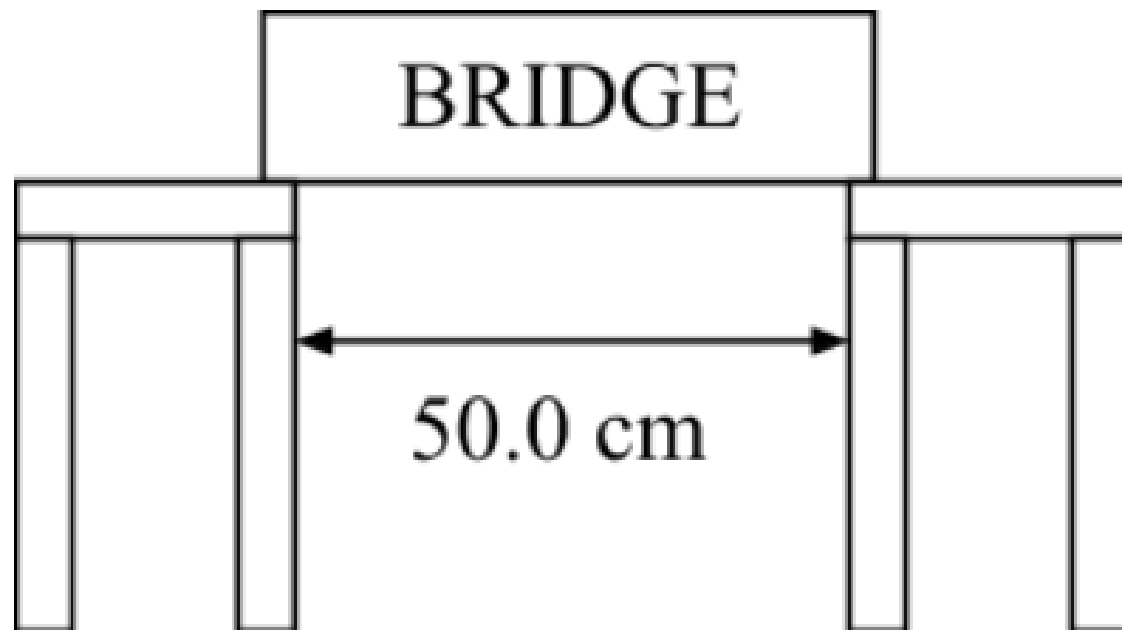
- o 2 pts for answering each question in your evaluation
 - Where and how did it fail?
 - How could you prevent this if you were to build it again?
 - Did your bridge fail because of design or construction?
- o 4 pts for submitting the photo.

PART III – BRIDGE CRITERIA

Each group is to build a bridge made from spaghetti and glue/epoxy/resin. The objective is to construct a bridge that will carry the heaviest load while still meeting specifications. Bridges will be loaded until they fail.

RULES:

- The bridge is to be built from regular spaghetti
 - o PENALTY – **DISQUALIFICATION!**





RULES:

- The bridge cannot touch the sides of the platforms

DISQUALIFICATION

- The bridge must be **over 50 cm long**

If the Bridge is not long Enough

PENALTIES for moving the platforms

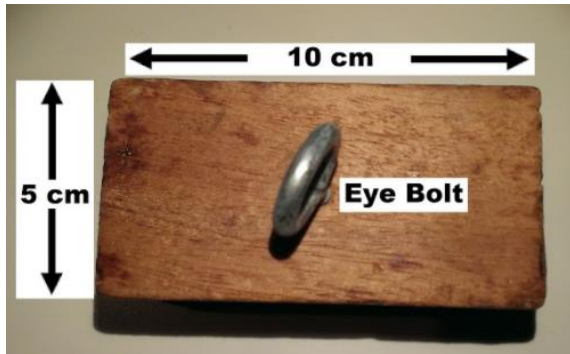
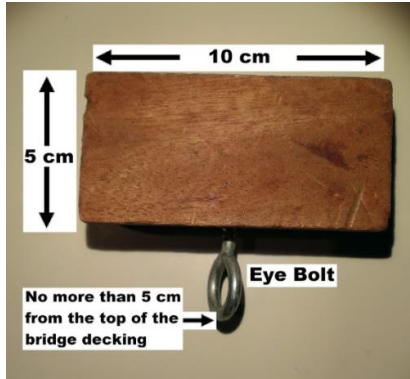
- o 0-5 cm = 5 pt deduction
- o 5-10 cm = 10 pt deduction,
- o 10-15 cm = 15 pt deduction
- o >15 cm will result in **DISQUALIFICATION!**

Decking



- Must have a 5cm wide road
- Gaps in the road no thicker than 2.00 mm
- PENALTY – 5 pt deduction

Loading Platform



- o a car (the loading platform) must be able to move along the entire length of the bridge
- PENALTY – 5 pt deduction

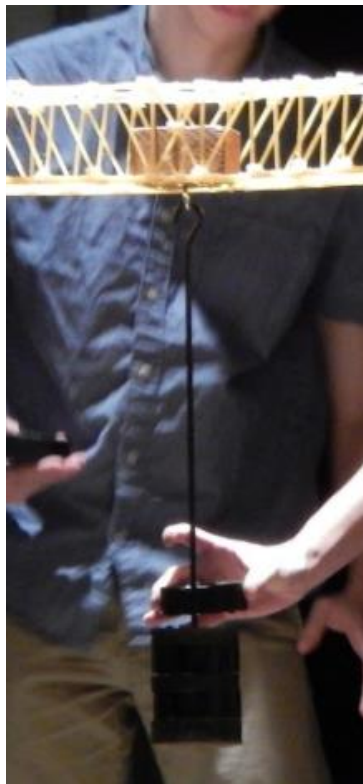
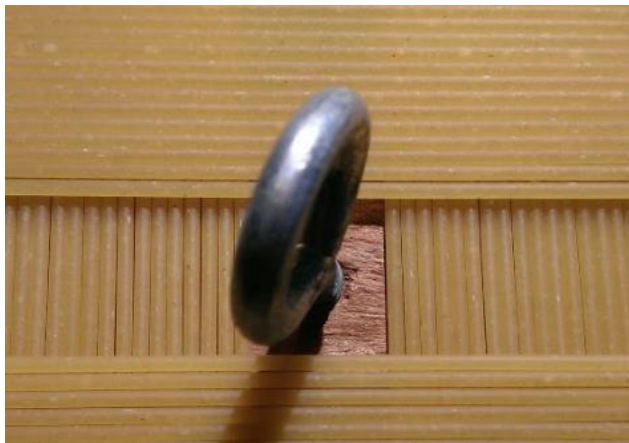
Decking Height

- o The deck of the bridge must not be more than 5.0 cm above or below the ends of the bridge



- PENALTY – 5 pt deduction

A Hole in the Decking



- There must be a hole in the deck for the eye bolt to go through
 - o PENALTY – **DISQUALIFICATION**

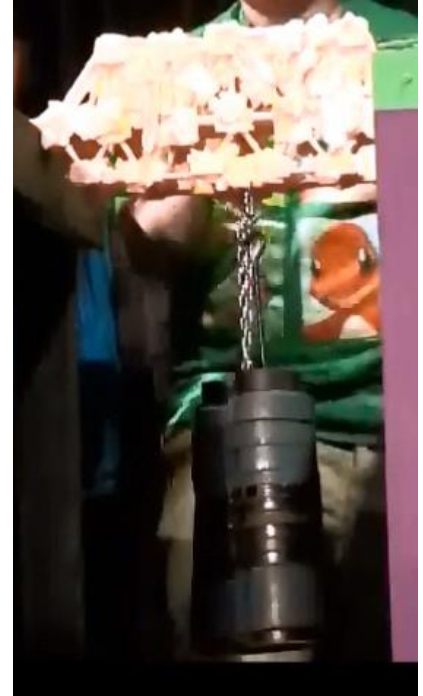
Maximum Height

- 25 cm
- PENALTY –
 - o 25- 30 cm = 5 pt deduction
 - o >30cm will result in **DISQUALIFICATION**



Mass of the Bridge

- Mass limit of 400 g.
- PENALTY
 - o – 450-500 g = 5 pt deduction
 - o 500-550 g = 10 pt deduction
 - o 550-600 g = 15 pt deduction
 - o >600 g will result in **DISQUALIFICATION!**



GRADE

Part I (**SOLO**) = 33 pts max (questions, webquest, video)

Part II (**GROUP**)= 47 pts max (photos of bridges, photo during construction, scale drawing and failure evaluation)

$$\text{Ratio} = \frac{\textit{Mass Held}}{\textit{Mass of the Bridge}}$$