



# Engineering Merit Badge Day Two Homework: Building a “Bridge” (5b)

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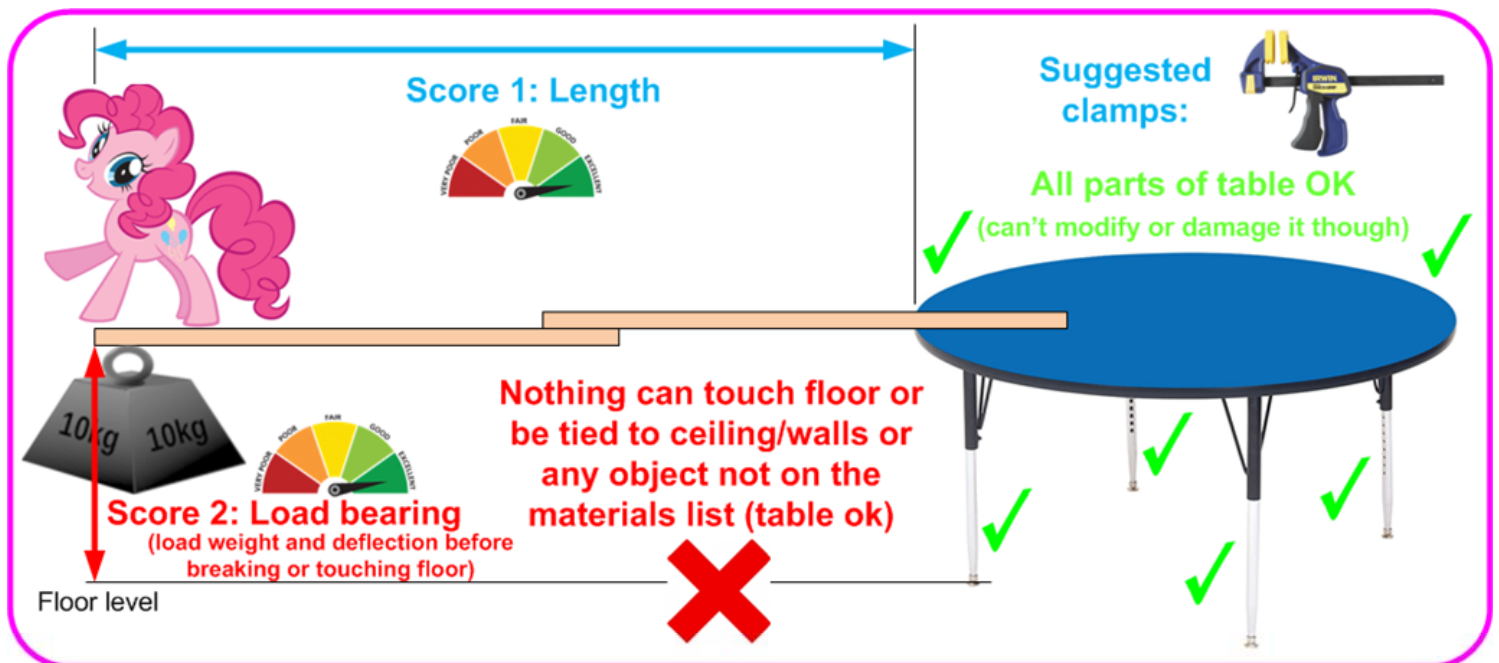
## Overview and Instructions

Here is the official text of Requirement 5:

5. Do one of the following:

- (a) Use the systems engineering approach to make step-by-step plans for your next campout. List alternative ideas for such items as program schedule, campsites, transportation, and costs. Tell why you made the choices you did and what improvements were made.
- (b) (Mr. Eric's homework) Make an original design for a piece of patrol equipment. Use the systems engineering approach to help you decide how it should work and look. Draw plans for it. Show the plans to your counselor, explain why you designed it the way you did, and explain how you would make it

Mr. Eric has selected a Princess Pony Diving Board as your absolutely vital piece of Patrol equipment for Requirement 5b, here is the general concept:



**Instructions:** Review the materials list on the next page, make plans for your “bridge,” build your “bridge,” test it, and then email Mr. Eric your workbook plus pictures of your plans and finished project.

**If you want to do something else for this requirement (either 5a or 5b), negotiate with Mr. Eric via email (CC your parents)**

Merit Badge Counselor: Eric Cutright, Troop 1028/1029, Charlottesville, VA – visit us at [www.troop1028.org](http://www.troop1028.org)



# Engineering Merit Badge

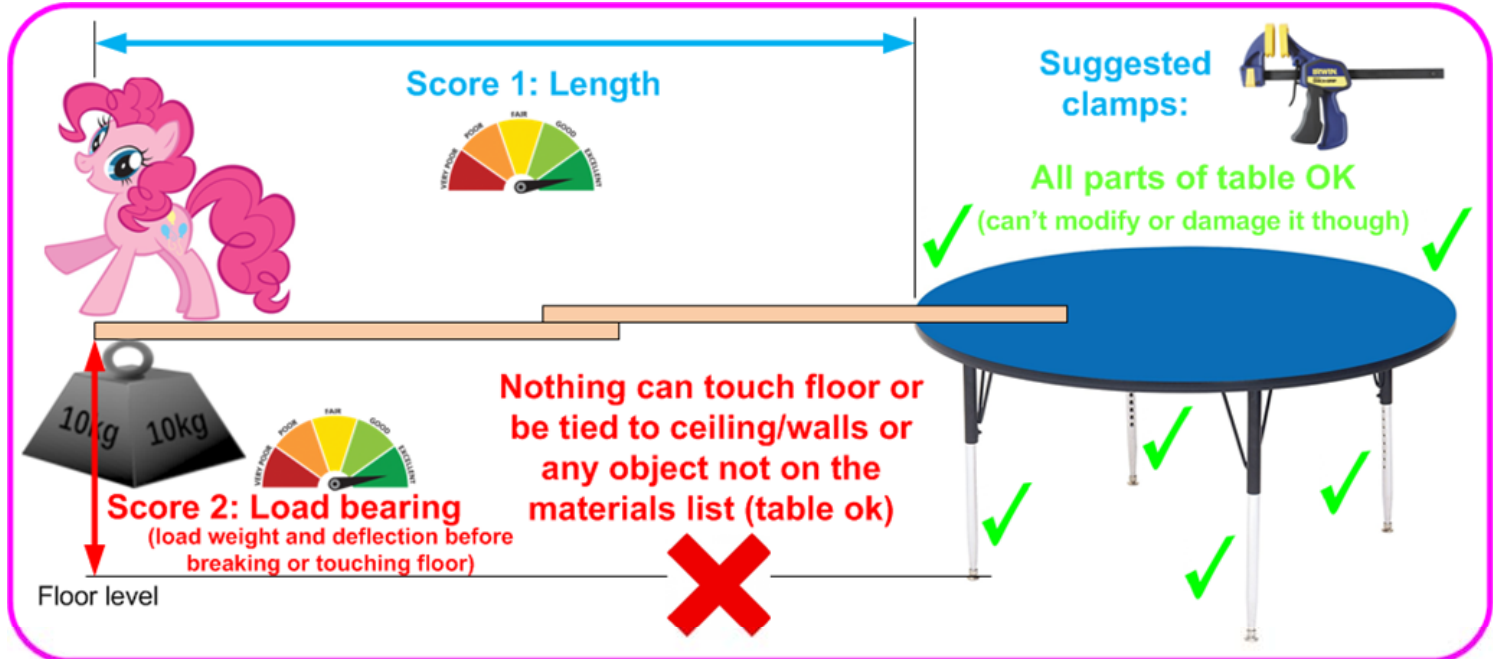
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### Materials List

Your mission is to design and build a Princess Pony Diving Board:



“Required” parts (think why I would suggest these)

- Three 8 foot bridge sections  
Mr. Eric suggests: 1" x 2" x 8' furring strip (actual size = 0.75" x 1.5" x 8'), \$1.18 at Lowes
- 2 wooden yardsticks
- 2 small clamps, 2 large clamps – something like this:
- 20 feet painter’s masking tape or similar
- 200 feet of string (and scissors for cutting)
- 1 Princess Pony (or another exciting object to use as a “load” for your bridge)
- **Optional: up to 50 LEGO pieces of your choice**



But Mr. Eric dude, what if I don’t have all this stuff at home?

- If you don’t have the exact part, be creative and use what you have at home – don’t buy anything, and don’t exceed my list !
- If you have nothing, email me for help (CC your parents)

**See the rules on the next page !**



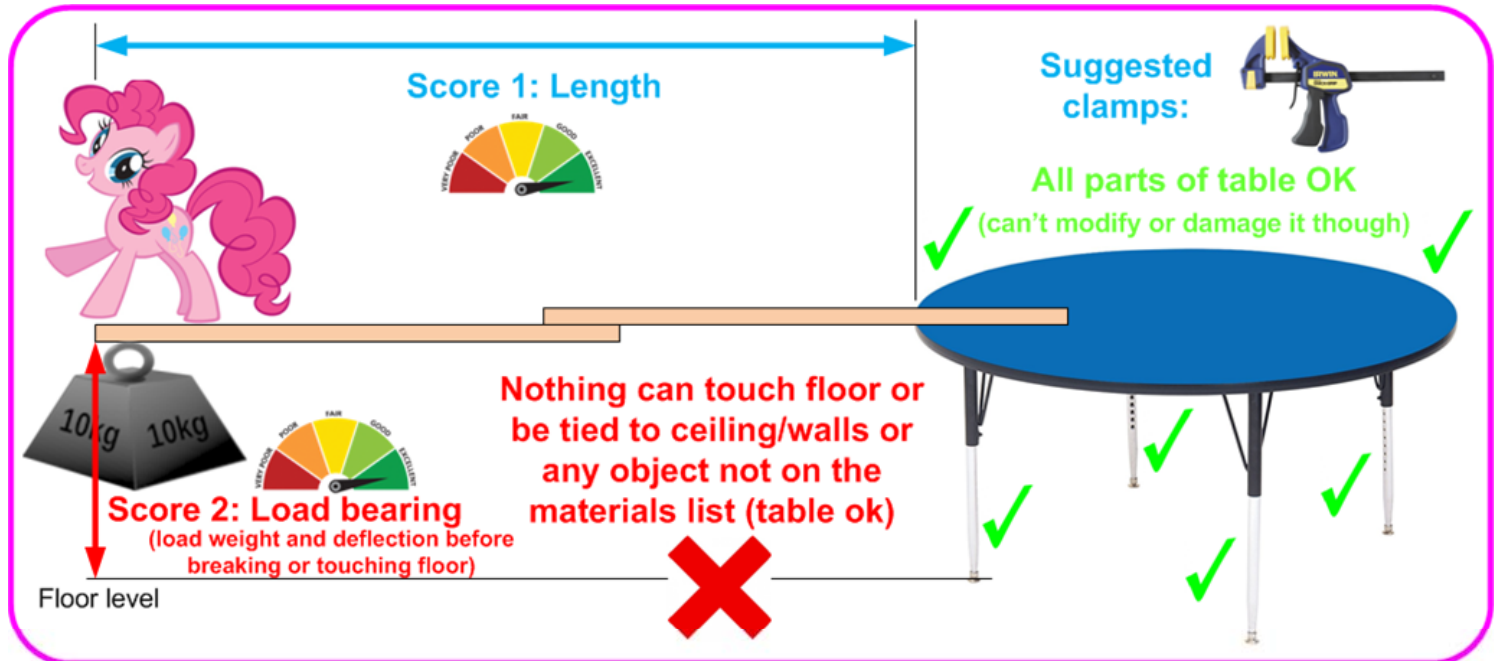
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## The Rules !!

Your mission is to design and build a Princess Pony Diving Board:



### The rules:

- You must draw a design plan for your bridge, and fill out the workbook (see below)
- You cannot exceed the materials list but may substitute equivalents
- You are making a single-anchor point suspension bridge (a.k.a. diving board) that must be attached to the table (without damaging or modifying the table)
- No part of the structure can touch the floor or be tied to the ceiling/walls or anything in the room
  - Exception: can tie to anything on the materials list or any part of the table
- No modification of parts (can't drill holes, break, etc.)
  - Exception: can cut string and tape as desired
- Load must be placed on the very furthest “floating” end of your bridge

To get credit for this requirement, you must email Mr. Eric this:

- Picture of your design plan
- Picture of your finished bridge
- Workbook filled out, explaining your design and your results for length (from edge of table) and load bearing (weight of load and the deflection in inches from start)

**Good luck, and may no Princess Ponies be harmed during this project !!**