

"To Make the Best Better"

4-H Youth Development



Discipline: All
Age Level: All
Time: 60-90 minutes

Next Generation Science
Standard : K-2-ETSI-2
Engineering Design

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Simple Structures – Bridge

Objective/Success Indicators: Students will understand how physiology of the human body is used to “engineer” a stable platform for better shooting sports performance.

Assessment Question: Does shooting position affect shooting performance?

Supplies:

Gallon sized Ziploc bag for each group of 2-4 youth, with:
6-10 Paper clips
25-40 drinking straws (or stir sticks)
~2 feet of masking tape (stick to outside of bag)
item to suspend or support (eg. Steel ball, stack of pennies, lead fishing weight)

3-4 rubber bands
~4 feet of string
4-8 index cards

Feel free to replace items with whatever you have on hand; make the “kits” ahead of time.

Lesson Outline:

1. Explain the terms bridge, force, mass, gravity, structural integrity and stability.
2. Break the group into small teams of 2-4 students equipped with one of the ziploc bags. Challenge the teams to build a structure that meets certain criteria (e.g. bridge a 12” chasm (created by stacks of books or table tops) support at least 25 pennies, and be freestanding (freestanding is important so each team can move their bridge into position between the books or the table tops for evaluation.)
3. Give the teams time (approximately 30 minutes) to evaluate the items in their Ziploc bag, design and test a structure.
4. As a large group, evaluate the results. Discuss common successful design traits, and novel approaches. Reinforce the terms and how they are illustrated with a bridge.
5. Brainstorm the different forces that are exerted on a real life bridge, and then in small groups decide which of those forces are exerted on the human body in shooting sports, and what can be done to create a more stable structure.
6. Report back in the large group, and ask the youth to decide which stability measures they will incorporate into their shooting during practice.



Background Information:**Terms**

Bridge – structure designed to carry a load over an unsupported area

Force - strength or energy as an attribute of physical action or movement

Mass - the quantity of matter in a body regardless of its volume or of any forces acting on it

Gravity - the force of attraction between all masses in the universe

Stability - the strength to stand or endure

Structural Integrity - the ability of an item to hold together under a load, including its own weight, resisting breakage or bending

Additional Resources:

More information, ideas and challenges on bridge building is located at:

<http://www.pbs.org/wgbh/buildingbig/bridge/index.html>

Try the other Simple Structures activities for Cantilevers and Towers