



Drexel-SDP GK-12 ACTIVITY

Activity

• Subject Area(s): ***Motion, Energy, Design***

Associated Unit: ***K'Nex Force and Motion***

Associated Lesson: ***BoulderDash***

Activity Title: ***Whose Bridge is the Strongest?***

Grade Level: ***(6-8)***

Time Required: ***60-90 minutes***

Group Size: ***Classroom***

Summary: ***A new take on a classic exercise; using K'Nex students design and construct a bridge to hold either a 500g or 1 kg weight. The lesson actually serves as a contest, as the team with the longest bridge to support such a weight wins!***

Engineering Context: Bridge building is one of the most commonly associated tasks for an engineer. Bridges remain an integral part of the world's infrastructures, and their design and maintainace keep citizens safe and happy.

Keywords: ***Motion, Force, Energy, Design, Kinetics, Potential***

Educational Standards: ***[PA] 3.2.7D, 3.4.7C, 3.6.7C***

Materials List

- Intermediate K'Nex set (roughly 500 pieces), measuring tape/ruler, worksheet

Methods and Procedure:

Procedures:

1. I took the time to separate all the pieces shown on the attached worksheet into small bags. I then set up a table/desk in the back where I would sit with all the pieces. Its important as a competition to make sure the students follow the rules and do not take extra pieces.

2. As the pieces are listed on the sheet, the students are asked to draw their design down on the bottom portion of the sheet then list the amount of each piece they would need. They are given 15 of the connectors and 15 of the rods for a total of 30 pieces. If they don't have the design down I didn't give them pieces, same goes for the amount of pieces, which need to be written down so they don't change their minds.

3. I gave them some time to construct their original designs. They all make mistakes choosing which pieces to use. I told them at first that there are no exchanges. Its tough, but a good exercise in making due with what you have. You can give them the opportunity to exchange roughly halfway through class or some other landmark time.

4. Students should be given around 20 minutes to make a bridge for the lighter weight, then another 20-30 for the large weight. Each time they only get 3 attempts for the weight to be put on their bridges.

5. Tails are not allowed! The longest, FUNCTIONAL, part of the bridge is what should be measured, not any other part attached to the end. These kids are tricky as you all know.

6. Once a bridge has proven to hold the weight, have the student group write their length down on the front board so the remaining groups can see it. Once one goes up, the others really start working hard. The first group to finish may continue to work on increasing their length, however they only get 3 total attempts still.

Assessment: Did their bridge hold the weight or not? Critical thinking and design, then feedback to alter the design is the most effective form of assessment.

Attachments: **Bridge Worksheet**

References: **www.knex.com (education link)**

Owner

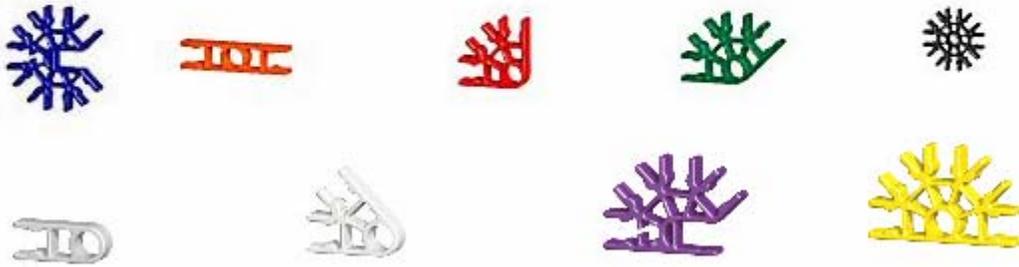
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Who's Bridge is Strongest?



Design: Underneath the line here pick out which **15** rods and **15** you and your group is using for your bridge design. Make a quick sketch of what you think your bridge should look like.
