Civil Engineering Gumdrop Structures

Activity Name:	Civil Engineering: Gumdrop Structures
How long did it take?	1 hour
Materials:	*50 toothpicks (per group) *20 gumdrops (per group)

Vocabulary to know about for this activity:
Sturdy - Stable or strong

Load- Weight the structure needs to hold

Background/Things to know about for this activity:
Civil engineers deal with the construction of public structures such as dams, roads, buildings, and bridges. It is very important that civil engineers be very careful when designing their structures to ensure that they are safe and sturdy for the people that use them because if their design fails, those people are at a high risk of getting injured.

Preparation (what should one do to prepare)::
Gather Materials
Make copies of worksheets

Procedure (how to go about the activity):
Introduction:
1. Brainstorm with the class what a civil engineer might do or build.
2. One type of structure that civil engineers design is a tower. Towers need to be very tall and support immense loads.
3. Discuss sturdy shapes (triangles vs. squares)
4. Discuss how you might make a sturdy tower using the materials:

- Pass out materials to each group.
- Talk about avoiding squares in order to use more triangles and how to use the materials most effectively.

Activity:

Tower Construction
1. Explain to students that they will be constructing towers using the given materials. Write down the requirements:

- The tower has to be two toothpicks tall.
- The tower must support a load in the form of text books placed on top.

Testing the Towers
1. When a group is ready to test, have students to place their tower on the table.
2. Test the tower by adding text books to the top. Increase the weight by one text book each time. You may use different sized text books depending on how much weight you think the towers will hold.
3. Once a group has completed their tests, have them redesign their tower to improve on their first design.

Conclusion
1. Ask each group to briefly describe their tower: Was it thin or wide? Short or tall? What shapes did they use? How did it fail?
2. Ask students to discuss the difficulties they encountered: Did the limited amount of materials make it difficult to complete their original design? What weak point caused their tower to break?
3. Ask students to discuss how they would redesign their tower.

Extensions and Modification:
1. Build a redesigned tower and test it.
2. Make the tower taller.

3. Use fewer materials.

How can the EDP or engineering design practices be incorporated into this activity?
Redesign as students test and evaluate their designs

Comment: In the comment field please comment of how this activity went for you, how long it took, how long you expected it to take, if there were any other materials that you would have wanted to have, how your was teacher involved in this activity, if it was age/grade level appropriate for the students and any other comments about this activity you think are important for the next person to use this activity to know.

Photos:

There are no images attached to this page.

Worksheet: