Honeycomb Building

Science Standards Addressed (from the Colorado Department of Education)
http://www.cde.state.co.us/coscience/statetstandards

**Standard 1 - Physical Science**
- Preschool - 1 - Objects have properties and characteristics
- Preschool - 2 - There are cause-and-effect relationships in everyday experiences

**Standard 2 - Life Science**
- Preschool - 1 - Living things have characteristics and basic needs
- Preschool - 2 - Living things develop in predictable patterns
- 2nd Grade - 1 - Organisms depend on their habitat’s nonliving parts to satisfy their needs
- 4th Grade - 3 - There is interaction and interdependence between and among living and nonliving components of ecosystems

**Objective:** To demonstrate the strength of a honeycomb by building and modifying them to support the weight of various objects

**Materials:**
- Paper (8.5”x11”)
- Scissors
- Tape
- Heavy, flat objects (books, etc)
- Cylindrical objects of various sizes (water bottle, pencil, highlighter, etc)

**Procedure:**
1. If using smaller object (pencil, highlighter), take paper and fold in half width wise. If using larger object (soda/water bottle) cut along folded line, then skip to step 4.
2. Fold again length wise, and again, for a total of 8 equal sections of paper.
3. Cut out all 8 sections.
4. Wrap one section around the object tightly, trying to accurately mimic its circumference. Tape the rolled up paper so it is the same circumference as the object.
5. Repeat step 4 until enough tubes have been made to support one book.
6. Gather assembled tubes into a circular group, then tape around the outer edge of the circle to increase stability of tubes and create a honeycomb.
7. Place book on top of honeycomb to test whether it is structurally stable enough to support the weight of the book. Discuss how many tubes the groups made to hold one book.
8. Repeat step 4 until enough tubes have been made to hold 4 books.
9. Repeat steps 6 and 7 with 4 books. Discuss how many more tubes were necessary to hold the weight of 4 books (4 times the original amount or no?)
10. Repeat step 4 until enough tubes have been made to support weight of the lightest member of the group. Discuss differences in weight between 4 books and the lightest person.
11. Repeat steps 6 and 7, having the lightest person put their weight gently in the center of the honeycomb. Discuss whether honeycombs failed or were able to support the weight of the person.

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**References:**
https://www.curiositymachine.org/challenges/50/