



Name_____

Date_____ Period_____

Fettuccini Physics: The Study of Opposing Forces

An object is supported by a structure when the *upward force* exerted by the structure balances the *downward force* due to gravity on the object.

MATERIALS: one meter of masking tape, 20 pieces of uncooked fettuccini, textbooks

PROCEDURE:

1. Design and build a structure or a group of structures that will exert an *upward force* equal to the *downward force* exerted on the books by the Earth's gravity.
2. Only the uncooked fettuccini and the masking tape may be used.
3. The structure or structures must support the books above the table so a 1-inch ruler, held upright, can slide between the desk and all four sides of the bottom book.
4. You are not required to use all the pasta nor all the tape.
5. After one book is supported, the height of the book from the table will be measured. (cm)
6. Books will be placed on by the builder. Carefully observe your structure as you add books.
7. The most books held up for at least 30 seconds wins.
8. In case of a tie, the structure that held the books the highest from the table will be the winner.

Before you begin to build any structures, sketch your initial plans below:

Before placing any books on your completed structure, sketch your design below:

Questions:

1. How far did your structure hold the first book above the table? (in centimeters)
2. How many books did your structure hold for at least 30 seconds?
3. Carefully remove the stack of books from your broken pasta structure. Did you see or can you tell which part of your structure broke first?
4. Make a list of observations and changes you could make to improve your design to make a similar structure stronger. Include a drawing in the space below.
5. What happened when the *upward force* from the pasta structure was greater than the *downward force* exerted on the books by gravity?
6. What happened when the *upward force* from the pasta structure was less than the *downward force* exerted on the books by gravity?