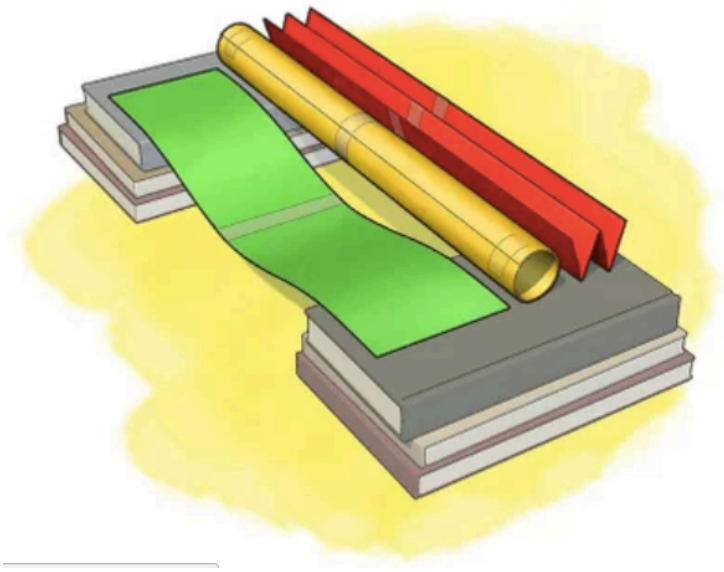
NAME _____ _____

Does the shape of a bridge make a difference in its strength? Duh?...Yes!



You will be doing a series of experiments with single sheets of paper.

In the **first** trial you will see how strong (or weak) a flat piece of paper is. The **second** trial is for a round tube. (actually two- side by side tubes) and the **third** trial is for an accordion like shape. We will see which is best.

I predict that the shape _____ will be strongest because _____

_____

_____.

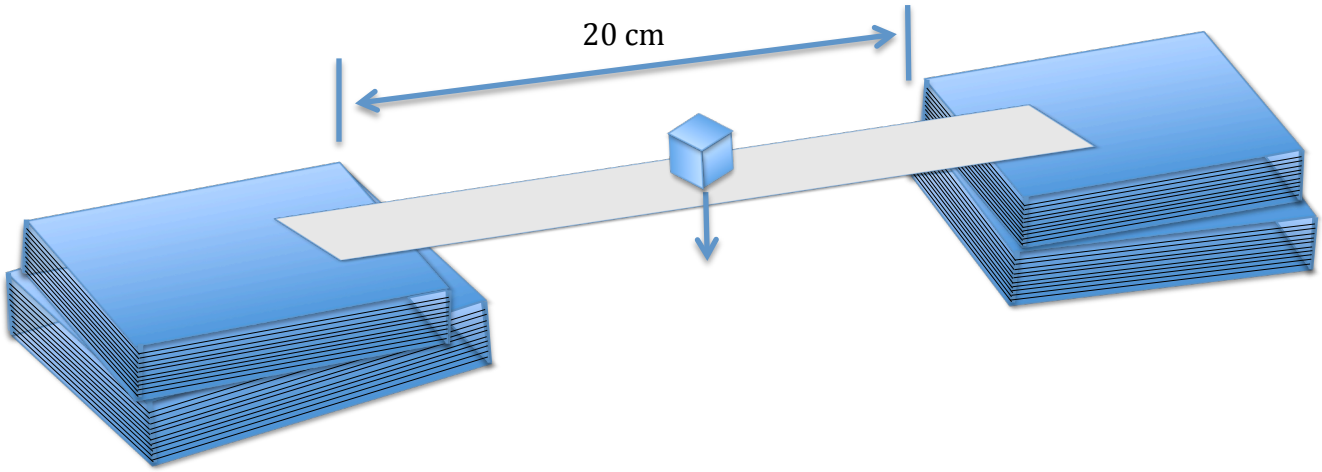
FOLLOW THE DIRECTIONS BELOW.
Answer all questions in the form of complete sentences.

1. Stack 2 or 3 books on top of each other as shown above to make a span of 20 cm.

2. Fold a piece of paper in thirds (width divided by 3) and tape it with a tiny amount of tape to itself to keep it from unfolding.

Answer as a complete sentence.

3. Is this first bridge strong enough to hold its own weight?



4. If the paper can hold its own weight, place 1 gram cubes onto the center of the paper until the beam collapses and touched the table at the center.

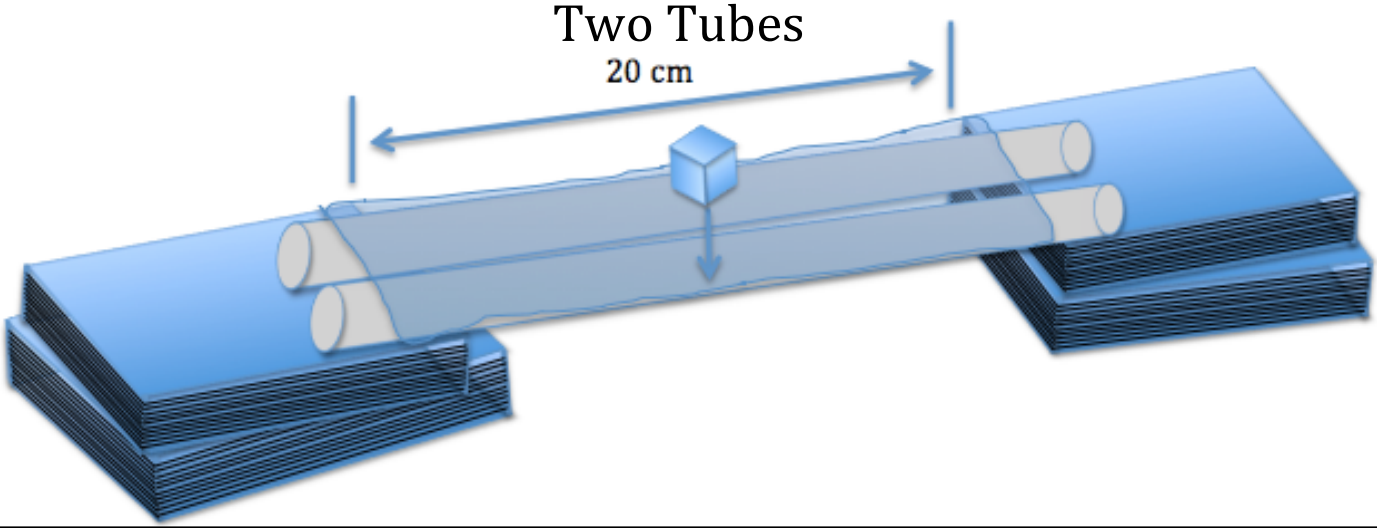
5. How many grams did the paper hold up BEFORE it failed? Repeat for a total of 3 trials find the average weight held. Keep the span at 20 CM for every trial.

Trial #	SPAN Distance	Weight Supported in grams
1	20 cm	
2	20 cm	
3	20 cm	
	Average >	

$$\overline{X} = \frac{\sum X}{N}$$

6. The average weight help by a single sheet of paper across a 20 cm span was _____ grams.

Two Tubes



For this trial you will cut a sheet of paper in half along the long direction and produce two tubes. A strip of paper will be placed on top to create the deck of the bridge. Place the weights on the deck and record the strength.

1. Cut a sheet of paper in half and roll each piece to form a tube. Tape the tubes on the ends and center to keep them round.

2. Lay the tubes side by side and tape a strip of paper over them as a deck. This will add no significant strength to the bridge but will let you place weight on the deck of the bridge.

3. Add weights slowly until the bridge collapses. Repeat 3 times recording the results each time.

$$\overline{X} = \frac{\sum X}{N}$$

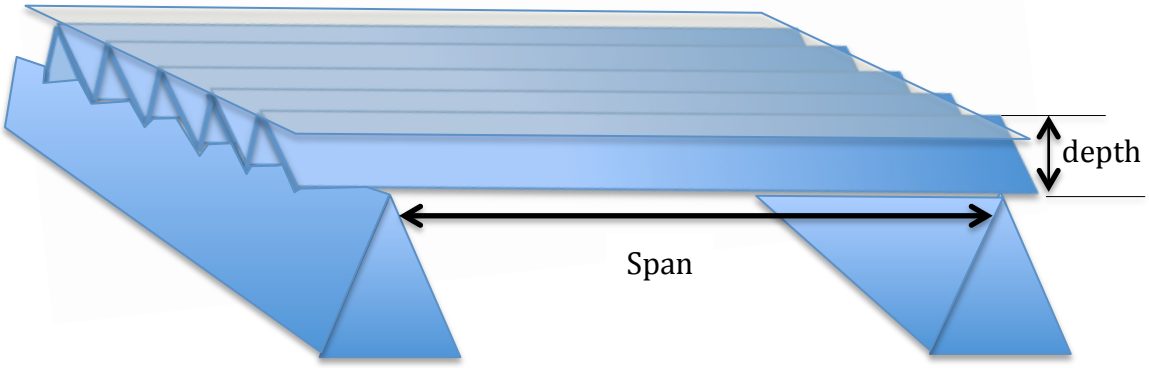
Two Tubes Trial #	SPAN Distance	Weight Supported in grams
1	20 cm	
2	20 cm	
3	20 cm	
	Average >	

4. The average weight help by a two tube paper bridge across a 20 cm span was

_____ grams.

The Accordion Design

For this trial you will fold a sheet of paper back and forth to form a fan or accordion shape A strip of paper will be taped on top to create the deck of the bridge. Place the weights on the deck and record the strength.



1. Fold a sheet of paper back and forth evenly. You will attempt to make the depth equal to that of the tube design.

2. Lay a strip of paper over the top to form a deck and tape it on. This will add no significant strength to the bridge but will let you place weight on the deck of the bridge.

3. Add weights slowly until the bridge collapses. Repeat 3 times recording the results each time.

Fan Trial #	SPAN Distance	Weight Supported in grams
1	20 cm	
2	20 cm	
3	20 cm	
	Average >	

4. The average weight help by an accordion paper bridge across a 20 cm span was

_____ grams.