



NAME:	
PERIOD:	
START DATE:	
DUE DATE:	
TEACHER:	

STRUCTURE LAB #1

ACTIVITY - Exploring Tension and Compression (10 pts)

Terms to know: (1pt)

- Compression =
- Tension =
- Resist =

SUPPLIES: each group needs the following from the supply table

- (4) regular boards
- long board
- (4) 2 inch bolts
- 3 inch bolts
- cables
- wing nuts or hex nut

PART ONE

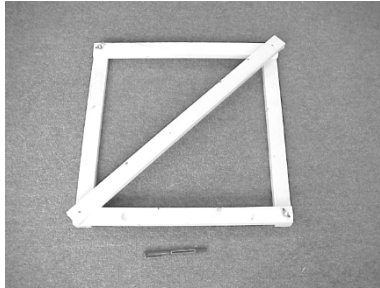
1. Lay out four boards in the shape of a square.
2. Align the predrilled holes and put one two inch bolt through each hole.
3. Thread one wing nut on each bolt.
4. See photo below for what your square should look like.



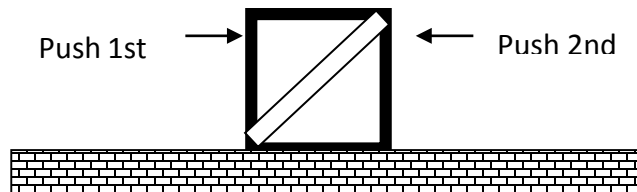
5. Pick up the square with one hand gripping in the middle of one board. Hold the board in a vertical position.
6. (1pt) Describe what happens to the square's shape when you pick it up.

Why does this happen?

7. Remove two 2" bolts in opposite corners and add 3" bolts. Then add the painted white wood crosspiece to your square. Tighten the nuts. You should now have a square that is divided into two triangle shapes.

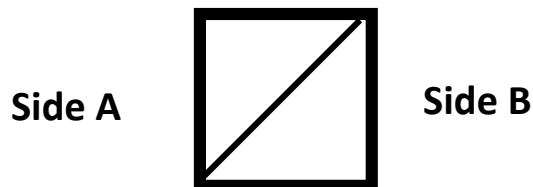


8. Set the square on the floor in front of you and gently push down on the top of the square and rock it from side to side.

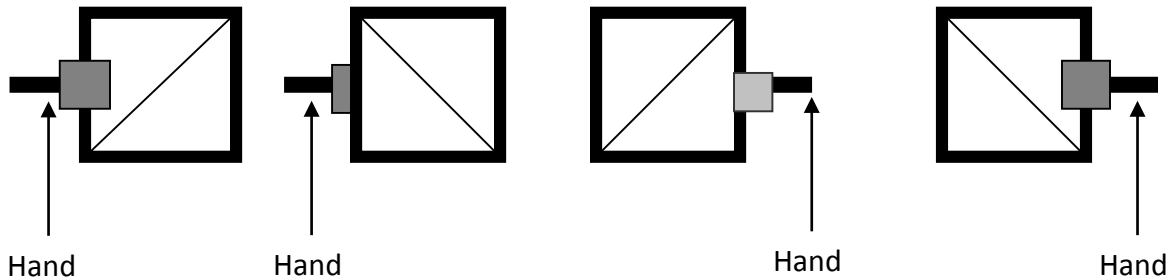


9. (1pt) Describe what happens to the square's shape when you rock it from side to side.
10. When you push the top of the square from side to side **the wood cross brace** keeps the square from collapsing. Why is this?
- A. The wood cross brace can only resist the force of compression
 - B. The wood cross brace can only resist the force of tension.
 - C. The wood cross brace resists the forces of tension and compression
 - D. The wood cross brace can only resist the force of gravity

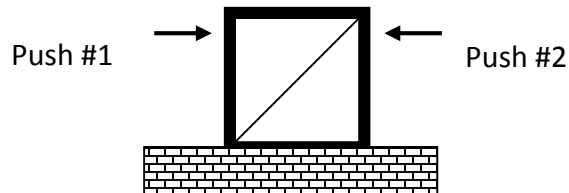
11. Remove the wood cross brace and add **one** cable brace in its place.
12. Try This: Pick up the square with one hand gripping in the middle of one board. Hold the board in a vertical position. Now hold the square up by each side. Watch your fingers if one side collapses!



13. (1ps) In the diagrams below circle the structures that will hold their shape and put an X on the structures that will collapse. The cross brace is a cable.

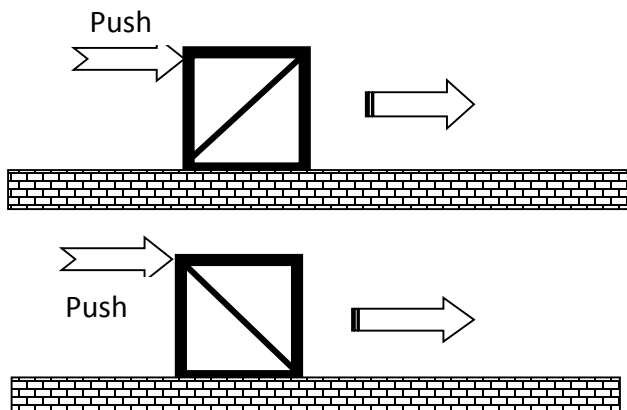


14. Try this: Set the square on the floor in front of you and gently push down on the top of the square and rock it from side to side.



15. (1pts) Now do this:

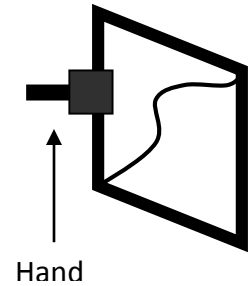
Draw how the squares will look below



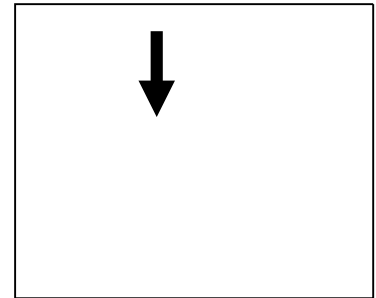
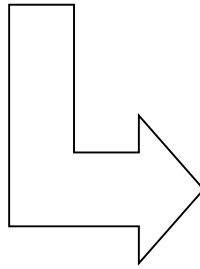
16. Circle one When you push the top of the square from side to side the cable cross brace keeps the square from collapsing. Why is this?

- A. The cable cross brace can only resist the force of compression
- B. The cable cross brace can only resist the force of tension.
- C. The cable cross brace resists the forces of tension and compression
- D. The cable cross brace can only resist the force of gravity

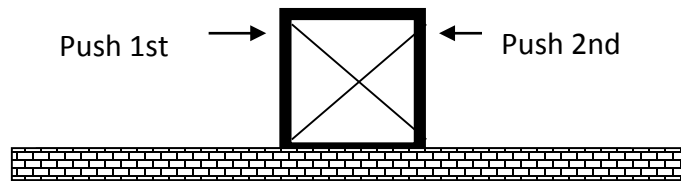
17. (1pt) Explain why the frame in the picture below is not a square. Why has the single cable brace not kept the square from collapsing?
Use the terms tension and compression in your answer.



18. Add a second cable brace to make an X.



19. Pick up the square with one hand gripping in the middle of one board. Hold the board in a vertical position and carefully shake it around.
20. Set the square on the floor in front of you and gently push down on the top of the square and rock it from side to side.



21. Circle one When you push the top of the square from side to side the two cable cross braces keep the square from collapsing. Why is this?
- A. The cable cross braces can only resist the force of compression
 - B. The cable cross braces can only resist the force of tension.
 - C. The cable cross braces resists the forces of tension and compression
 - D. The cable cross braces can only resist the force of gravity

22. (1pt) The right side of this gate drags in the dirt when it is opened. How can this gate be repaired if you only have cable or wire to do the job? Draw the repaired gate to the right. Use the least amount of material to do the job.

