

Structures and Designs

Lab #4 Beams

NAME: _____

Due: _____

Purpose: To discover what shape makes a beam the strongest.

Hypothesis:

Material: construction paper, scissors, glue, clay and 2 books the same height.

Procedure:

- 1) Construct a solid beam.
 - a. Cut 4 strips of paper, each 10 cm by 23 cm.
 - b. Glue all 4 pieces of paper in a stack. (Do not use a lot of glue as you could end up testing the glue strength and not the strength of the shape)

- 2) Construct an I beam
 - a. Cut 2 strips of paper, each 10 cm by 23 cm.
 - b. On one strip, draw 2 lines 2.5cm from the long edge.
 - c. Fold the edges of the paper along the two drawn lines.
 - d. Mark and fold the other strip the same way.
 - e. Glue the two strips back to back so that you make an "I" column.
 - f. Cut 2 more strips of paper 5 cm by 23 cm.
 - g. Glue one strip to each side of the "I" beam.



- 3) You should now have 2 different beams.
- 4) Place 2 books of equal height approximately 18 cm apart.
- 5) Place one beam across the span.
- 6) Place weights or clay on the beam near the centre of the span.
- 7) Continue until the beam fails.
- 8) Record the max amount of mass that the beam could hold. (Don't include the weight that broke it.)
- 9) Repeat steps 6-9 for the remaining beam.

Data: Complete the chart--- include the units of measurement!

<u>Beam Shape</u>	<u>Span</u>	<u>Max load</u>

Analysis Questions:

- A) What type of stress were you testing?
- B) Did you use equal amounts of material to make the same beams?
- C) Explain why it is more economical to use I beams.
- D) List three places that you would find beams.

Sources of Error: (on loose leaf)

Conclusion: (on loose leaf)

<u>FEEDBACK</u>		
<input type="checkbox"/> Incomplete or not handed in by due date <input type="checkbox"/> Messy or missing data <input type="checkbox"/> Poor knowledge exhibited in analysis questions <input type="checkbox"/> Few or weak sources of error <input type="checkbox"/> Incorrect or unclear conclusion <input type="checkbox"/> Redo and parent signature required	<input type="checkbox"/> Complete by due date with accuracy <input type="checkbox"/> Accurate data <input type="checkbox"/> Good knowledge exhibited in analysis questions <input type="checkbox"/> Credible sources of error <input type="checkbox"/> Conclusion needs support	<input type="checkbox"/> Completed by due date with detail <input type="checkbox"/> Accurate & clean data <input type="checkbox"/> Excellent knowledge exhibited in analysis questions <input type="checkbox"/> Insightful sources of error <input type="checkbox"/> Supported conclusion