

# Grade 8 Technology Worksheet

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## Material support

### **Cantilevers**

A cantilever is a beam that is fixed at one end only. The beam is likely to bend when a load is put on the end of it. The top is in tension and the bottom is under compression. The longer the beam, the more likely it is to bend when loaded.

For this reason one needs to look at how the cantilever can be supported – remembering that it is still fixed at only one end.

### **The problem**

Siyazama Construction Company has been asked to submit designs and a model for a cantilever sundeck to be constructed in a new development. As this deck will be used by several people at once, it is essential that it is perfectly safe and it can support a maximum weight whilst being economical in costs. This is a lucrative contract, so Siyazama Construction Company has enlisted your help.

### ***The brief***

Your group is to design and make an efficient cantilever using only the 24 straws and 50 cm of cellotape provided. It should project as far as possible, using only the material provided, whilst supporting as great a load as possible. Once you have completed the two cantilevers on each side of the deck, decide on the size of your sundeck floor and cut out the floor from a sheet of cardboard. This should be:

- presented as an annotated sketch or working drawing to show the design
- constructed from plastic drinking straws
- joined together with cellotape
- fastened to a surface, e.g. a wall, with cellotape
- support as great a load as possible

Test the strength by balancing an empty 2 litre Coke bottle which you gradually fill up before the cantilever collapses, i.e. you test to destruction. Identify which cantilever can support the greatest load.

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You will be assessed as follows:

Level	Descriptor
4	<b>Thorough understanding</b> <ul style="list-style-type: none"> <li>• Consistently and actively works towards group goals.</li> <li>• Is sensitive to the feelings and needs of others.</li> <li>• Willingly accepts the individual role in the group.</li> <li>• Consistently contributes knowledge and understanding and skills.</li> <li>• Values the contributions of others.</li> <li>• Helps identify and encourages change if necessary.</li> </ul>
3	<b>Good understanding</b> <ul style="list-style-type: none"> <li>• Works willingly towards group goals.</li> <li>• Accepts and fulfils individual role in group.</li> <li>• Contributes knowledge and understanding and skills.</li> <li>• Sensitive to others.</li> <li>• Willingly participates in needed change.</li> </ul>
2	<b>Satisfactory understanding</b> <ul style="list-style-type: none"> <li>• Works towards group goals.</li> <li>• Contributes to group with occasional prompting.</li> <li>• Sensitive to others.</li> <li>• Participates in needed change, occasionally with prompting.</li> </ul>
1	<b>Needs improvement</b> <ul style="list-style-type: none"> <li>• Works towards group goals only when prompted.</li> <li>• Contributes to group only when prompted.</li> <li>• Needs occasional reminders to be sensitive to the needs of others.</li> <li>• Participates in needed changes when prompted and encouraged.</li> </ul>

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## Suggested Solutions

Question number	Possible marks	Answers
1		Complete rubric in Appendix of Assessment Tools.

## Assessment rubric

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