Name: _____ Class: ____ Date: _____

Building a Balanced Balcony

Learner Outcomes:

- Infer how the stability of a model structure will be affected by changes in the distribution of mass within the structure and by changes in the design of its foundation.

Key Terms:

Stable structures	Balanced structures	Counter weight
Centre of gravity	Unbalanced structures	Cantilever

Background Information:

Whenever engineers or architects have to design a structure that is supported from only one side, such as a balcony, they are faced with a real challenge. With only one side supported, how can they make sure the structure does not fall over when it experiences stress? Centre of gravity and a balance of forces all play an important role in determining a structure's stability.

Research question: How can centre of gravity and balanced forces support a cantilevered balcony capable of supporting a load?

Specifications:

- Only the materials supplied may be used
- The tower must be free standing and at least 20 cm tall
- The balcony must extend at least 10 cm from the edge of the tower and must be supported on only one end
- Your team will have up to 30 minutes to build your structure.
- The balcony must support a Styrofoam cup half filled with sand

Materials:

15 plastic straws	paper clips	thread
5 recipe cards	250 mL Styrofoam cup	30 cm ruler
30 cm masking tape	sand	scissors
pins	modeling clay	

This investigation / activity has been adapted from:
Bullard J, Krupa G, Krupa M, et al. *Science Focus 7*. Toronto, ON: McGraw-Hill Ryerson.

Procedure:

1. Create a plan for your structure including a diagram describing how each component is expected to support the balanced balcony and a list of materials you will use.

2. List the criteria you believe should be used to assess the quality of your structure and create a scale with which your classmates can evaluate it.

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Balanced Balcony Plan

Overall Plan:

Materials:

Design Sketch:

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Evaluation Criteria:

Extension:

Find at least 15-20 examples of different types of balanced balconies and create a balanced balcony collage!

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