

Build Challenge: Paper Roller Coaster

Group members: _____

Task: Guelph wants to open up a theme park to draw more tourists to the area. One of the key draws will be a rollercoaster. Your group is one of many challenged with designed a thrilling, safe and solid coaster. You must build a small scale model of your best rollercoaster. Tools will be provided in class. Minimum standards must be met but there is room for creativity. There will be a winner chosen by the end! Will it be you?

Assessment: one of the 4 marks is a group mark. This is for the actually building of the roller coaster. The other marks individual marks. You may discuss amongst your group but everyone is to hand in their own word, in their own words.

Inquiry: Can you build a working rollercoaster that meets minimum standards?

Minimum: 3 different 'thrill' features must be present. You can choose from sharp curve, gentle curve, loop and funnel.
 **Note: A solid, square, neatly built coaster will earn a '+' in your level. ie: a coaster with 3 thrills that keeps the marble on the track that is sloppily built will earn a 3-. The same coaster built neatly and square will earn a 3+

Level 1	Level 2	Level 3	Level 4
doesn't have 3 thrills.	3 thrills but rider doesn't stay on tracks	3 thrills plus rider stays on track	4+ thrills. You need to add an extra one or two! Best efforts will have a coaster theme/name. Pride in build is evident!
Go Green! Excessive use of materials (ie: tape!) will result in a reduced grade			

Communication: Can you communicate methods and procedures clearly with appropriate language?

How will you measure distance? How will you measure displacement? Describe your method for each clearly with unit-specific language?

Level 1	Level 2	Level 3	Level 4
An attempt is made to write out method but it is unclear to reader.	Method is written out with some appropriate language. There is some minor points of confusion.	Reader understands method. Appropriate language used most of the time.	Reader clearly understands method. Appropriate language used often. Labelled sketch included which helps clarify.

K & U - Can you calculate average speed and average velocity?

1. Calculate the average speed for your rollercoaster. Show your math.
2. Calculate the average velocity for your rollercoaster. Show math.

Level 1	Level 2	Level 3	Level 4
Only one calculation attempted or perhaps many serious errors.	Attempt to calculate average speed an average velocity. Errors.	Average speed and average velocity calculated with minor errors	Average speed and average velocity calculated correctly with no errors & appropriate sig digs.

Application : Can you reflect upon this process? Can you offer improvements?

What design challenges did you have? How did you solve them? Using the same equipment, what would you do as a roller coaster engineer to make the ride more enjoyable for riders if you had more time?

Level 1	Level 2	Level 3	Level 4
Attempted to answer reflective questions but very little detail, thought, explanation.	2 questions answered briefly.	All 3 reflective questions answered briefly.	All 3 reflective questions answered in detail. Several examples given and explained thoroughly.

Learning skill: cooperation – you will have the opportunity to give feed back on how well your group worked together.

Competition !

Paying customers want thrills and significant time spent on the ride. After all, they could be waiting in line for 2 hours to be on this rollercoaster. You also need to market your coaster – colours, theme and details are important to draw in riders.

Your coaster will be ranked according to 2 criteria:

→Time on ride: Longest ride → shortest ride (longest = 7 pts., 2nd longest 6 pts.....down to 1 pt)

→Thrill factor: Speed! Greatest speed at exit → slowest (7pts.....1 pt)

→Appearance: The classmates will anonymously vote for 1st, 2nd and 3rd best looking coaster.

Each 1st vote = 3 pt.

Each 2nd vote = 2 pts

Each 3rd vote = 1 pt.

The coaster with the most points is deemed the winner!....and earns the contract for building Guelph's newest rollercoaster!