

Name: \_\_\_\_\_

Hr: \_\_\_\_\_

# Designing a Roller Coaster

In this project you will be engineering and designing a roller coaster however you'd like to make it. The roller coaster needs to be set up to scale and drawn on graph paper and meet the following requirements. Make sure you follow the law of conservation of energy when designing the peaks and valleys of your coaster.

## Requirements:

**-NO copied blueprints or similar coasters. This is your own unique design**

-The coaster must 8 different data collection points on it

- First data collection point has to be at the peak before the first drop
- Second data collection point has to be at the bottom of the first drop
- The final 6 can be where ever you want (no repeats though)

-The coaster must have at least 5 carts

-The coaster must have riders

-You must calculate the mass of each cart, mass of all the riders and total mass of the entire thing (carts + riders)

-Each data collection point must include the following information

- PE =
- KE =
- Total Energy =
- Height =
- Velocity =
- Mass =

-Each data collection point must be labeled on your blue prints and cannot be the same as another point

-The blueprints must be to scale (make a key in the corner)

-The blueprints must be in color

- Add trees and other features in your blueprints (again to scale) to give a size comparison
- You must add one global monument on your blueprints that is also to scale
  - (Pyramids, Statue of Liberty, Eiffel Tower, etc....)

-All measurements in your blueprints must be metric.

-Make sure you check and double check all your calculations and data. The data needs to be extremely accurate. Use the attached data sheet to help you organize your data.



## Data Sheet

Number of Carts = \_\_\_\_\_

Number of Riders = \_\_\_\_\_

Mass of 1 Cart = \_\_\_\_\_

Mass of all Riders = \_\_\_\_\_

Total Mass = \_\_\_\_\_



<u>Point A</u>	<u>Point B</u>	<u>Point C</u>	<u>Point D</u>
PE = _____	PE = _____	PE = _____	PE = _____
KE = _____	KE = _____	KE = _____	KE = _____
Total Energy = _____	Total Energy = _____	Total Energy = _____	Total Energy = _____
Height = _____	Height = _____	Height = _____	Height = _____
Velocity = _____	Velocity = _____	Velocity = _____	Velocity = _____
Mass = _____	Mass = _____	Mass = _____	Mass = _____

<u>Point E</u>	<u>Point F</u>	<u>Point G</u>	<u>Point H</u>
PE = _____	PE = _____	PE = _____	PE = _____
KE = _____	KE = _____	KE = _____	KE = _____
Total Energy = _____	Total Energy = _____	Total Energy = _____	Total Energy = _____
Height = _____	Height = _____	Height = _____	Height = _____
Velocity = _____	Velocity = _____	Velocity = _____	Velocity = _____
Mass = _____	Mass = _____	Mass = _____	Mass = _____



## Formulas:

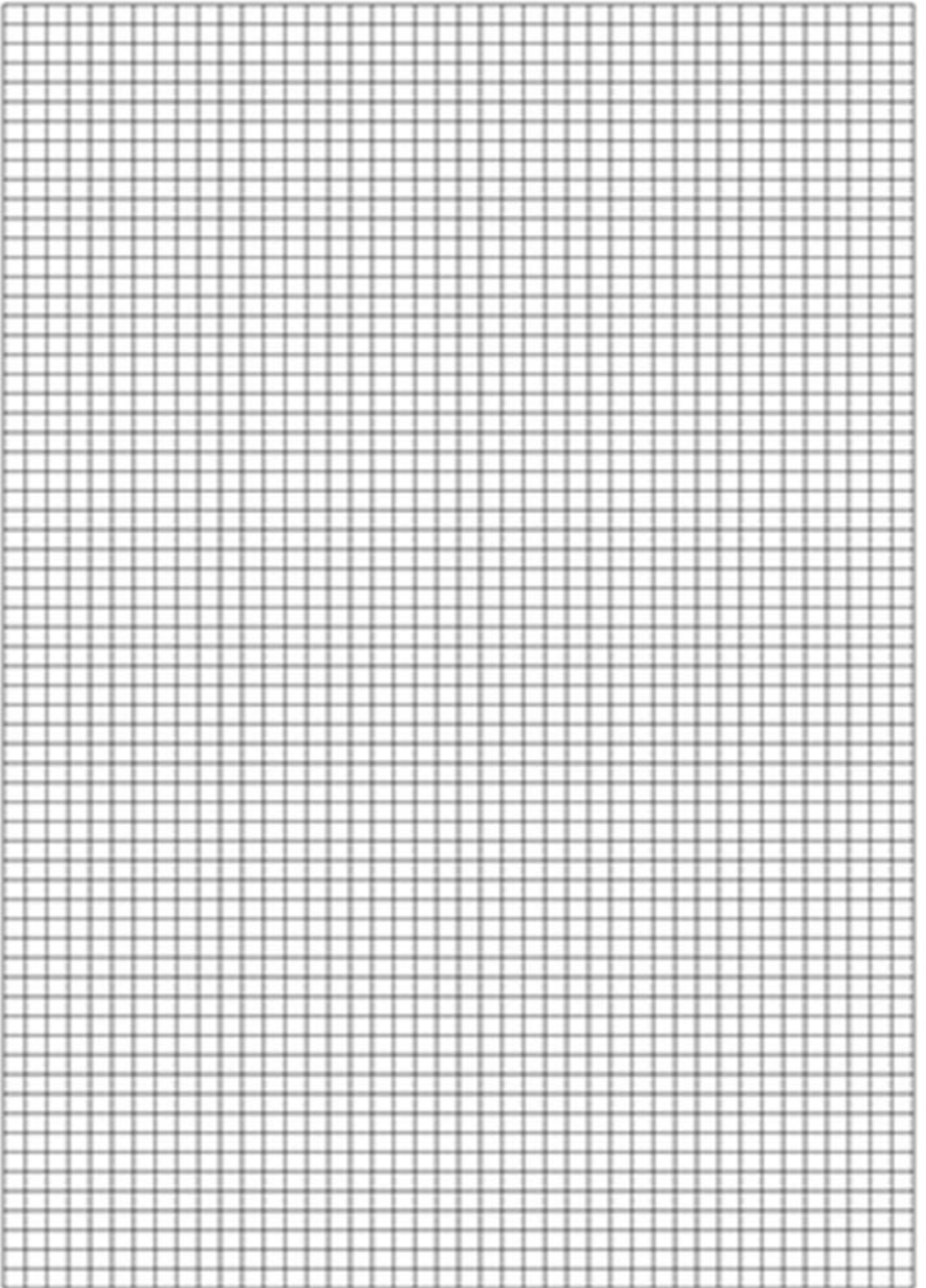
$$\text{Total Energy} = \text{PE} + \text{KE}$$

$$\text{KE} = (1/2) * m * v^2$$

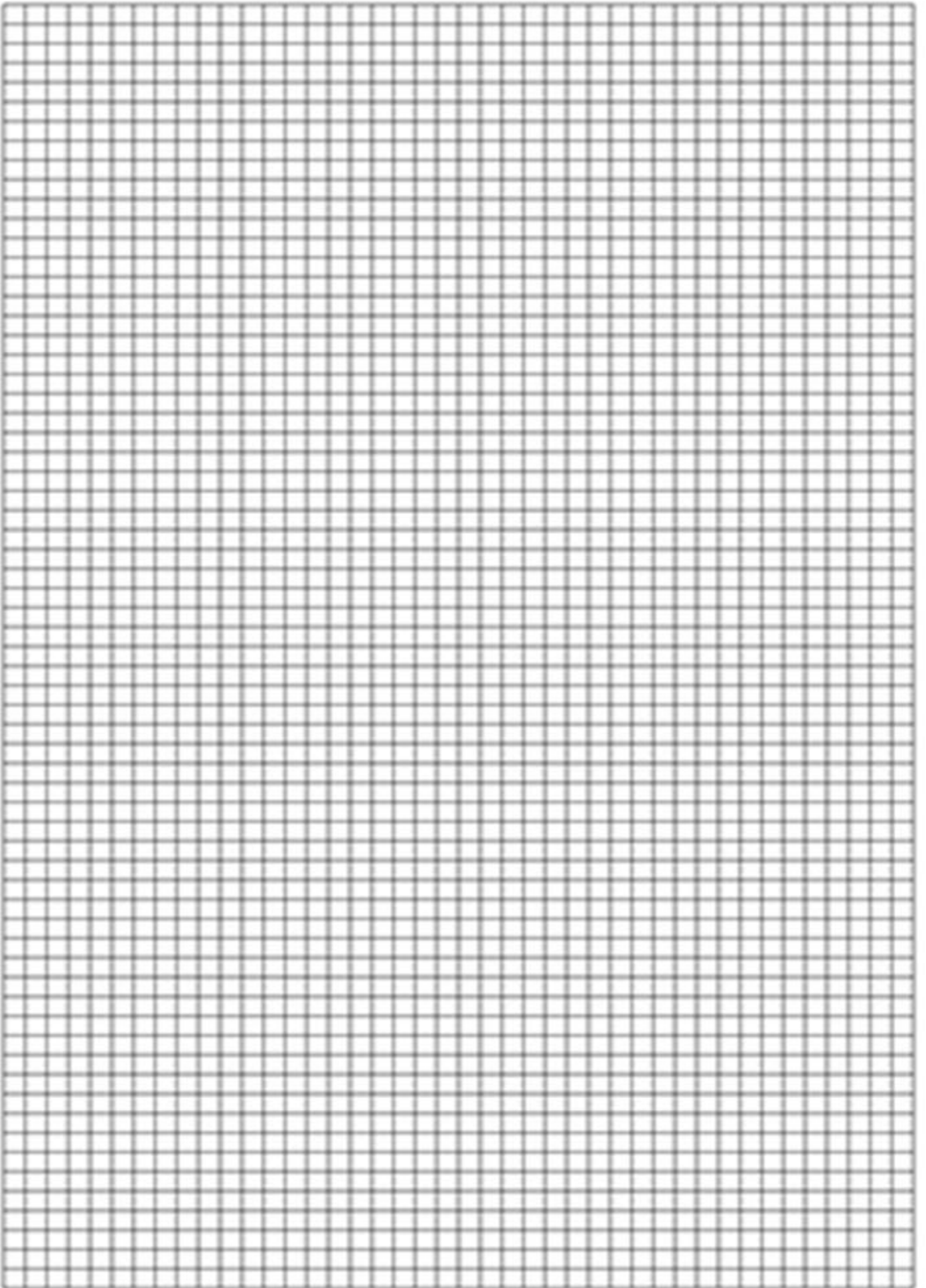
$$\text{PE} = m * h * (9.8 \text{ m/s}^2)$$



Scale= 1 box = \_\_\_\_\_



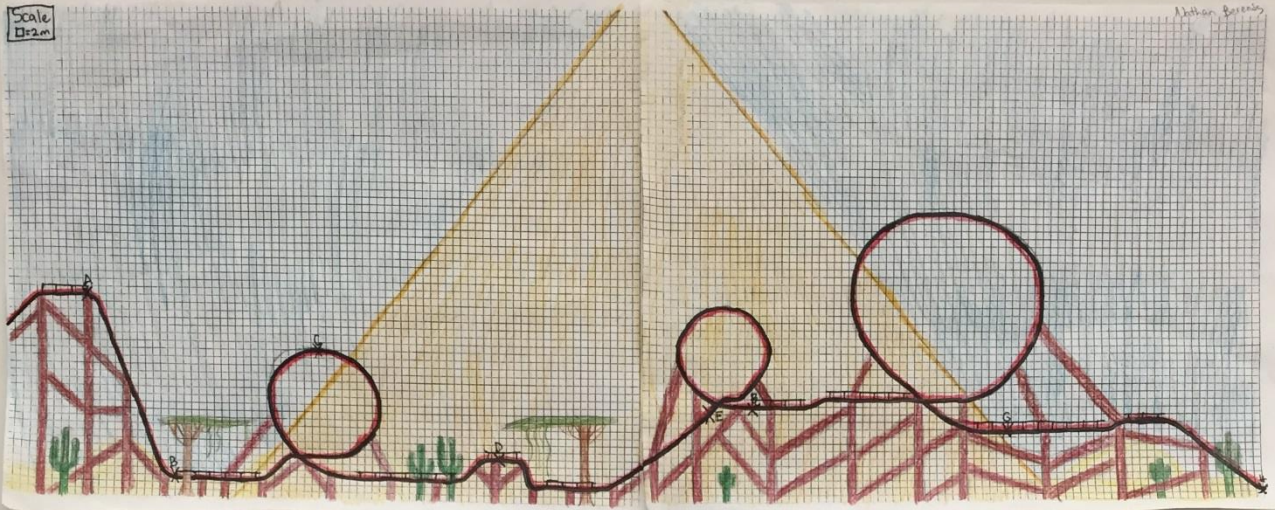
Scale= 1 box = \_\_\_\_\_



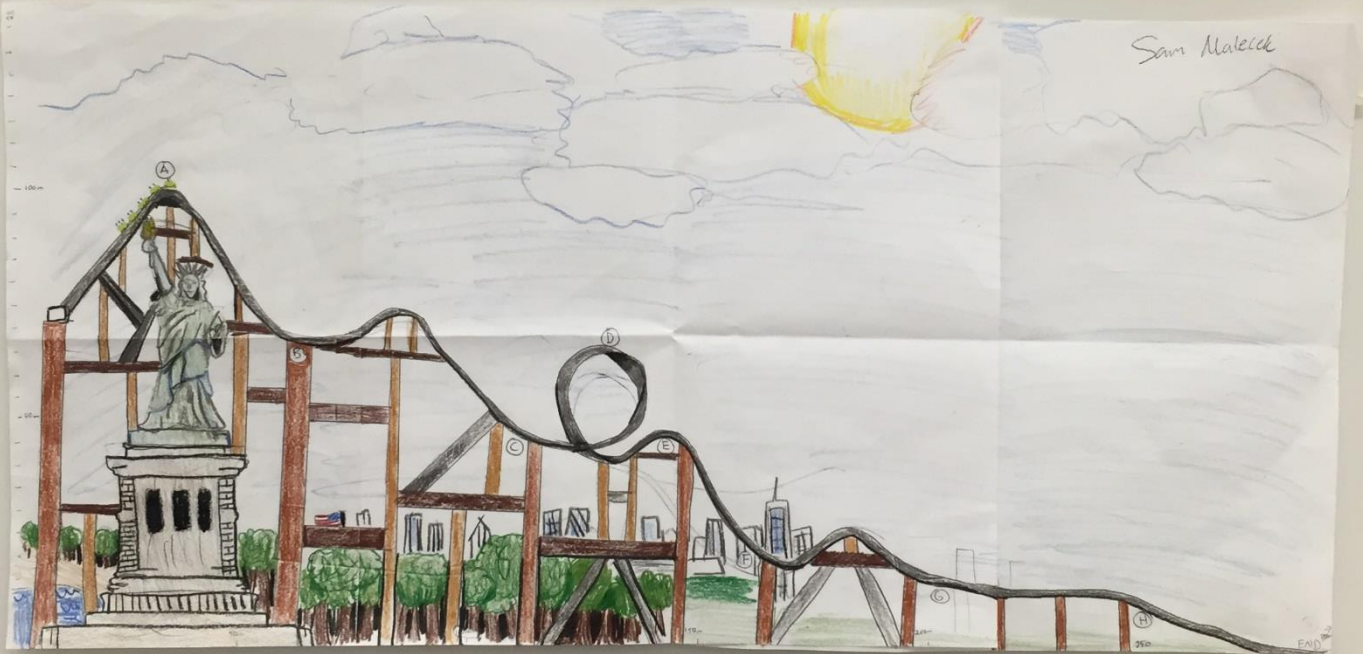
# Examples

Scale  
1cm = 2m

Nathan Greene



Sam Maleck



Austin Knapcz

