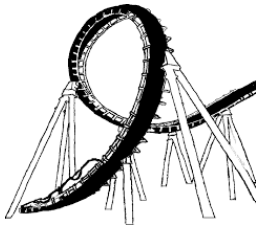
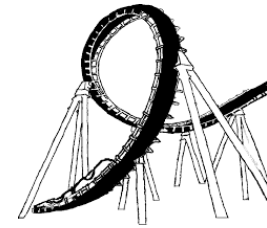


Engineering Team Member Name(s): _____ Due Date: _____



Paper Roller Coaster Project



Scenario: Ever wonder why Disney decided to build a Disneyland Hotel (Aulani) and not extend it to a Disneyland Theme Park too? Well just think about the possibilities of Hawaii opening its very first Disneyland location on one of the outer islands. Disneyland is recruiting fresh new engineers to help them in building a fresh new roller coaster that would become Hawaii's first thrilling ride at Disneyland's newest theme park location.

Purpose: To investigate and implement the concepts of Force & Motion. In a typical paper roller coaster, the speed of a marble will increase and decrease many times. In this activity, you will find the speed of the marble in different portions of a paper roller coaster. You will also find the average speed of the marble during the entire trip down the paper roller coaster

Task:

1. The He'eia Elementary 6th Grade Engineering Teams will be taking on the task of competing for a bid to build a roller coaster for Disney Theme Parks. Your task is to design and build a durable paper roller coaster model using the templates provided in the (www.paperrollercoaster.com) kit. Your team also needs to be able to explain the physics behind it.
2. The roller coaster must include at two curves, loops, hills, and one additional ride element of your team's own design to allow a marble to successfully complete the track 3/3 times own its own from start to finish. The roller coaster should apply the following science concepts: distance, time, speed, velocity, acceleration, gravity, centripetal acceleration/force, and potential/kinetic energy.
3. You and your team will be expected to keep an engineering design notebook journal that will show you cycling through the engineering design process [(1) Ask, (2) Imagine, (3) Plan, (4) Create, (5) Improve].
4. You will then present with your team your roller coaster prototype to the amusement park manager for Disney (teacher) and a panel of roller coaster enthusiasts (fellow students) and explain the design and build of the roller coaster and why it is the most fun and exciting of all the designs that will be presented.

Engineering Team Member Name(s): _____ Grade: _____

	Roller Coaster Specifications/Requirements	Possible	Score
1	Roller coaster should use the provided materials and apply the following science concepts: distance, time, speed, velocity, acceleration, gravity, centripetal acceleration/force, and potential/kinetic energy in the design.	5	
2	Roller coaster includes at least two curves, loops, and hills (each element adds to the fun & excitement of the roller coaster).	12	
3	Roller coaster includes one ride element of your own design (each element adds to the fun & excitement of the roller coaster).	5	
4	Design and build a durable free-standing roller coaster that can be used more than once.	4	
5	<ul style="list-style-type: none"> Marble successfully completes the track 3/3 times. Marble maintains contact with the track throughout each run. 	6	
6	<ul style="list-style-type: none"> Sign identifying the roller coaster is prominently displayed Sign shows the name of the roller coaster, the names of the designers/builders, and their color group. Sign is neat & attractive 	3	
	Total:	35	

Engineering Design Process - Roller Coaster Engineering Notebook & Average Speed Lab	Possible	Score
Roller Coaster Engineering Notebook: <ul style="list-style-type: none"> Describe the elements that you built into your roller coaster. Explain why you build those elements. Explanations include the concepts of distance, time, speed, velocity, acceleration, gravity, centripetal acceleration/force, potential/kinetic energy, and Newton's 3 Laws of Motion. 	35	
Calculating Average Speed of the Rolling Marble Lab: <ul style="list-style-type: none"> Select starting and ending points of various points on your roller coaster. Measure distances between the two points. Calculate the average speed of the marble between the two points Record your results in a table. Complete related questions. 	20	
Total:	50	

Engineering Team Presentation	Possible	Score
Information: <ul style="list-style-type: none"> Describe the elements that you built into your roller coaster. Explain why you build those elements. Explanations include the concepts of distance, time, speed, velocity, acceleration, gravity, centripetal acceleration/force, potential/kinetic energy, and Newton's 3 Laws of Motion. 	5	
Sales Pitch: <ul style="list-style-type: none"> Explain why your roller coaster is the best. Explanations supported by physics concepts. Physics concepts are related to fun, excitement, and safety. 	5	
Presentation Delivery: <ul style="list-style-type: none"> Preparedness: All group members know what to do and say, is able to explain without reading and is able to talk to the audience, pronounces words correctly, and is able to answer questions. Poise: Group members stand up straight and face the audience. Speaking Voice: Loud and clear (not too fast or slow). 	5	
Total:	15	

Paper Roller Coaster Project	Possible	Score
Roller Coaster Specifications/Requirements	35	
Engineering Design Process - Roller Coaster Engineering Notebook & Average Speed Lab	50	
Engineering Team Presentation	15	
Overall Total:	100	
Comments:		

